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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Chemistry at the B.A.

THE feeling entertained in certain quarters in favour of strictly reserving the presidency of the British Association to distinguished men of science, even to the exclusion of royal personalities like the Prince of Wales, must have been conciliated, if not entirely converted, by the sincerity of the Prince's effort to justify his selection. His presidential address was marked by an engaging modesty and sincerity, and no greater compliment could have been paid the Association than the honest work and thought employed to make it not unworthy of so high a position. The address deserves attention, not merely because the speaker was the Prince of Wales, but because of the careful study which produced it and of the thoughtful and sound matter it contained. It was a clear, shrewd, and comprehensive review of the part science has come to play throughout our civilisation, and of the increasing debt which organised society owes to it. Wisely confining himself to the general aspects of his subject and avoiding science in its purely technical aspects, the Prince succeeded as few could have done in giving the nation a broad and understanding vision of the wonderful way in which science, first in the pure stage and later in the applied, touches life at every point, and always beneficially.

The Chemistry section, always one of the more important, was worthily opened on Thursday by the sectional president, Professor Jocelyn Thorpe, who took as the subject of his presidential address "The Scope of Organic Chemistry." The address falls naturally into two parts. In the first the progress made in fundamental organic chemistry is reviewed with knowledge, and the whole case for pure research is stated in one sentence: "You must acquire a knowledge of the simple before you can attack the complex with any hope of success." Although advance in fundamental knowledge is slow, Professor Thorpe notes several points in which real progress has been made. Like most observers, he looks to biochemistry as one of the fields in which investigation may presently bring new knowledge bearing on the mystery of life—the problem never far from the mind of the true chemical student. All this is what might be expected from a distinguished organic chemist. What was less to be expected was Professor Thorpe's confident adventure into the applied field. Here he touched on many problems of immediate and enormously important industrial and human interest, such as the utilisation of forest products, the study of the hydrocarbons which form the main constituents of crude petroleum, and the need of sustained research into intermediates and dyestuffs. In these directions one sees how intimate the connection really is between the pure and applied branches, and what immense results may follow on the industrial side from one small advance in fundamental chemistry. Finally, as one intimately associated with chemical literature, he views with concern the ever-increasing output of matter, and the difficulty of finding library space for it. The address ends with a delightfully dry cynicism. "Civilisation," he says, "seems to be confronted with two ever-growing problems—the increase in its cemeteries and in its libraries. The former, no doubt, will be solved by cremation. Is it too much to hope that a judicious exercise of this method may also be applied to our libraries?" Could any editor, at his wits' end for space, have put the truth more politely?

Metallurgical Analysis

THE writer of the commercial letter in our Metallurgical Section this week draws attention to a matter that excited considerable discussion at the recent Congress of Chemists. He refers to the demand on the part of users of metals for analytical guarantees of their composition and complains that the makers have been rather weak in yielding to requests that almost amount to faddiness. Such requirements, he argues, put an additional burden on the makers, without ensuring any real advantage to the user. Much the same kind of comment was heard during and after the discussions

on non-corrosive metals and alloys at the Chemists' Congress. The demand for pure chemical lead and the insistence on knowing the exact composition of the metals and alloys used in chemical works indicate a new standpoint on the part of the user. He not only wants a metal that will serve his purpose but he wants to know also exactly what the metal is composed of. It may be that the latter knowledge is of little practical value, but the purchaser's view is that he is entitled to know exactly what he is buying.

From the point of view of the maker, however, and especially the maker of special steels, alloys, etc., this habit of demanding exact metallurgical analysis is naturally not one to be encouraged. The head of one of our greatest metallurgical concerns put it to us somewhat like this: "If I sell you a suit of clothes and it is entirely satisfactory in appearance and wear and everything else that matters, what benefit is it to the purchaser to have an exact analytical statement of the fibre from which it is made? From the maker's point of view there are two matters for comment. The first is that the supply of this analytical information—amounting in practice to an analytical guarantee—is of no practical value to the user, although it would put an additional obligation on the maker. Pressed to the extreme limit, it may become a pedantic demand. But the more serious matter is that among makers of special steels and alloys competition is intensely keen. The production of some metal or alloy with special characteristics may involve years of research and immense expenditure. Is it really fair to the maker that he should be asked to tell every purchaser exactly what it is composed of and the exact proportions of its constituents? To the user this information can have little more than an academical value, but its disclosure might seriously penalise the maker by giving away to competing makers results only obtained by long and very costly research and experiment. When we provide a steel or an alloy containing certain ascertained qualities and prepared for certain uses, our view is that the user should be content if it is found to possess those qualities and to satisfy those uses. To go beyond this, and to ask for exact analytical guarantees is, from the maker's point of view, to demand more than should fairly be asked, without giving the user any corresponding advantage."

These views, we imagine, represent the standpoint of most metallurgical firms, and they are entitled to consideration. At the same time, in nearly all industries, it is the demand of the consumer that ultimately fixes the standard. If, for example, on the part of chemical plant manufacturers or works managers who have to deal with plant, there is an insistent demand for analytical data respecting the materials they use, there will be some difficulty in resisting it. The matter is one of considerable interest from both sides, and we should be glad to hear further what makers and users think of it.

The Chemical Plant Exhibition

EXHIBITORS at the recent British Chemical Plant Exhibition have received from Mr. Woolcock, the secretary of the Chemical Plant Manufacturers' Association, a circular letter inviting suggestions for future exhibitions. To the first question, "Whether

the exhibition appeared to you to be successful," there can be only one answer. The exhibition was regarded as excellent by everyone who saw it. The only matter for regret is that it could not have been seen by much larger numbers. How that difficulty is to be overcome is one of the points to be considered in the future.

If the exhibition could have been placed in the same building as the Chemical Congress, it would have been a most attractive feature, but unfortunately accommodation of this kind is difficult to obtain. Another way of meeting the difficulty would be to keep it open for a longer period, but the disadvantage in that case would be the expense of maintaining staffs in attendance and the considerable rental costs. There is a general feeling that such an exhibition deserved a very large attendance, and perhaps out of the replies some practical suggestions for ensuring this may be obtained. As it was, the exhibits were inspected during the week by 2,071 visitors—920 trade, and 1,151 plain—and it is satisfactory to note that up to Friday the attendance showed a progressive daily increase. As to whether any future exhibitions should be held yearly or every two years, opinions will no doubt vary. It is, however, a fairly safe rule not to arrange such events too frequently, but to aim at exceptional good shows with adequate intervals between. The exhibitors and the organisers of the first exhibition did their work admirably; the only problem remaining is to discover some means of making the exhibition in future as widely accessible as possible.

"Anti-knock" Compounds

It is common knowledge that the efficiency of modern internal combustion engines working on a constant volume cycle is limited by the tendency of the fuel to detonate or "knock." Of all the fuels which may be used, the worst in this respect is a paraffin base petroleum. This undesirable property has been accentuated in post-war fuels by the fact that, in order to produce a straight run spirit at an economic price, more and more of the higher boiling point constituents of crude petroleum have to be incorporated in the motor spirit, and these compounds increase the tendency to knock. There are two methods of overcoming the trouble. Certain fuels are known, *e.g.*, benzol and alcohol, which detonate far less readily than petroleum, and one method of eliminating "knock" is to use a blend of petroleum spirit and benzol. Alcohol is hardly ever used, mainly because it is not miscible with petroleum unless it is absolutely dry. Recently it has been demonstrated that cracked spirits from the heavier petroleum fractions are less liable to knock than straight-run petrol having the same boiling point range, and it is now the practice to market blends of petroleum spirit and cracked spirits with or without addition of benzol. In this way economic fuels are produced which work satisfactorily in the modern motor engine. The second method of obviating knocking is to add a very small amount of an "anti-knock" compound. It was discovered before the war that small quantities of aniline and similar aromatic bases overcame knocking to a certain extent. Later it was found that lead tetraethyl was extraordinarily efficient in this respect. Only one part in over a thousand is

required to suppress knocking in quite a poor fuel spirit. What is, perhaps, much more important, it allowed of higher compressions in an engine running on good fuel. This, of course, means lower fuel consumption for a given power, and a greater all-round efficiency—a very vital consideration, especially in aircraft practice.

The history of the manufacture of lead tetraethyl in America along with its subsidiary developments, the launching of the bromine ship *Ethyl*, the rise of manufacture to a prominent branch of the organic chemical industry in such a short time, and finally the complicated legal problems which soon cropped up, form one of the romances of modern industrial chemistry. Latterly the Germans have entered the field with iron carbonyl, and, judging by a series of patents taken out in America by Midgley, all manner of organic or even non-metallic compounds can be used. There is every indication that extensive research is still being carried out on this problem. What has certainly been a great handicap to investigators is an almost complete ignorance of how these substances act. Up to the beginning of this year some thirteen theories had been advanced. Very recently Church, Mack, and Boord in America put forward the idea that these organo-metallic compounds break down in the cylinder of the engine and give rise to a cloud of very finely divided and easily oxidisable metallic dust which, burning at the appropriate moment, causes the gas mixture in the cylinder to inflame rapidly before detonation can be set up. These investigators adduced much experimental evidence in support of their theory, which appears to have received additional confirmation and support as a result of the discussion recently held by the Faraday Society. One of the papers read at this meeting gave the results obtained by two English chemists on the anti-detonating effects of metal sols. Colloidal solutions of various metals in petrol were used as fuels. The theoretical idea of the cloud of fine metallic particles was thus put into practice. The sols of iron, nickel, lead, and other readily oxidisable metals all possessed remarkable anti-knocking properties. Is it too early yet to conclude that another mystery of modern applied chemistry has at last yielded up its secret?

The Artificial Silk Industry

FEW chemical industries have shown such exceptional activity as is seen to-day in the artificial silk industry. The demand for these textiles has been so insistent and the supplies so limited that new manufacturing concerns have sprung up with a mushroom-like growth, and the next year should show an increased production far in advance of anything which we have hitherto experienced. One naturally wonders how the market will react under these circumstances and whether this production can be justified. It must be realised that artificial silk, although it has undoubtedly made considerable headway, is still only one of the lesser commercial fibres and it is not yet, in many respects, out of the experimental stage. Further, its manufacture is such a highly specialised branch of chemistry that many years must elapse before a sufficiency of competent chemists can be trained to control the new fac-

ories which increase of production entails. Difficulties, therefore, are bound to attend the growth of this new industry.

Viscose artificial silk, it is true, holds the field at present, but the modern tendency appears to be one of evading the competition in this type of fibre by the manufacture of various modified silks, and so we have the claims of copper silks and acetate silks advocated by their respective manufacturers, the former being recommended on account of the extraordinary fineness of the filament produced, equal to that of the natural silk-worm, and the latter by reason of its unique qualities by which it differs from all the other artificial silks. Further than this, viscose silk itself is now being made in several modified forms, as a round fibre and as flat or ribbon-like fibre or, latest development of all, as a hollow tube giving a silk of considerable softness and warmth with a pleasing and not too metallic lustre. Staple fibres are also coming to the fore. These are artificial silk fibres cut into convenient lengths suitable for spinning into yarn either alone or in admixture with other fibres such as cotton, wool or natural silk. In addition, these staple fibres are often treated chemically in order to give them the appearance of wool or natural silk. This branch of the industry bids fair to become one of very considerable importance.

This multiplicity of various artificial silks constitutes a very real danger to their future development. The varieties often react differently during the various spinning, weaving, dyeing and finishing processes through which they pass before being made into the finished material. At present there is no standard means of testing and grading artificial fibres, and already a certain amount of confusion is being caused by the varying nature of different manufacturers' products. The time appears to be ripe for the formation of a bureau of standardisation which will examine, standardise, and grade the different qualities. It is already being undertaken in America and might usefully be carried out in this country which, if not the birthplace, is truly the home of the artificial silk industry.

Books Received

- PLANT PRODUCTS. By S. Hoare Collins and George Redington. London: Baillière, Tindall and Cox. Pp. 275. 10s. 6d.
PYROXYLIN ENAMELS AND LACQUERS. By Samuel P. Wilson. London, Bombay, Sydney: Constable and Co., Ltd. Pp. 213. 18s.

The Calendar

Aug. 4-11	British Association for the Advancement of Science. Annual meeting. World Power Conference.	Oxford. Basle, Switzerland.
31 to Sept 12		
Sept 1 to 4	Institute of Metals: Autumn meeting.	Liège, Belgium.
6 to 11	American Chemical Society: 50th Anniversary.	Philadelphia, Pennsylvania.
20-	Chemists' Exhibition.	St. Andrew's Hall, Glasgow.
24 26 to Oct. 3	Société de Chimie Industrielle: Sixth Congress of Industrial Chemistry.	Brussels.

The Scope of Organic Chemistry

Professor J. F. Thorpe's Presidential Address

We give below the substance of the presidential address on "The Scope of Organic Chemistry," which Professor J. F. Thorpe delivered before the Chemistry Section of the British Association at Oxford, on Thursday.

THE chemistry of the compounds of carbon covers a wide field, wider than that covered by any other element. Its scope embraces all living matter, as well as the vast number of non-living substances which are produced through the agency of life. Moreover, it includes a very great number of compounds unrelated to life or to living processes which have been built up by the chemist in the laboratory by methods he has devised.

Already some 200,000 definite compounds have been tabulated in Richter's Lexicon and in the supplements thereto, and this number is increased yearly by several thousands through the agency of a band of zealous workers scattered over the globe. It may be well asked what is the good of continuing to increase this already astonishing number; and is the expenditure of time, labour and energy justified which lead to the discovery of some new fact having, apparently, no useful application to any department of human activity? The answers to these questions are quite clear and definite. You must acquire a knowledge of the simple before you can attack the complex with any hope of success. The element carbon has been used by nature as the basis of organised life because the capacity of carbon to combine with itself is shared by no other element, and it is upon this capacity that nature has relied in order to build up the tissues and reserve materials which form the living world around us. Until we can determine how a small number of carbon atoms combine one with the other we cannot hope to obtain any insight into the manner in which the more complex natural substances are built up, or any information regarding the way in which they are utilised to bring about the changes occurring during animal and vegetable metabolism.

The science of structural organic chemistry is only just fifty years old. It was born when the genius of van 't Hoff gave to the world the clue upon which the three dimensional formula we now use is based. It is, therefore, no inconsiderable achievement to have gained in so short a time a knowledge of many of the reactions and properties of the more simple complexes of carbon in combination with oxygen, nitrogen, and other elements. But much yet remains to be done before we can attack with any real hope of success the problems which the chemistry of nature presents.

The Electronic Theory

It is clear that our knowledge of the finer mechanism of reactions is slight, and that great as has been the advance made through the discovery of van 't Hoff, we are still at a loss to explain or predict the shades which determine whether one particular type of reaction will be more, or less, facile than another. The chief trouble seems to be that the electronic theories, which are quite satisfactory in themselves, are not yet developed so fully that they can include any quantitative statement relating to the changes in the free energy of systems. Yet it is evident that any theory of organic structure must conform to the modern physical conceptions of matter. The principle of shared electrons is primarily justified by its success in explaining the linking of atoms, i.e. valency, and by its successful interpretation of the theory of co-ordination and "onium" salt formation. The subsidiary hypothesis of electron displacement also provides a means by which an explanation can be supplied to account for the ease of formation, stability, and general reactions of conjugated systems, thus placing the hypothesis of Thiele on a sounder theoretical basis.

The ductility of the carbon to carbon bonds which have now been clearly demonstrated enables us to impart strains to certain parts of an organic molecule at will, and it is reasonable to assume that such strain when once set up will be shared as far as possible equally by all the atoms of the system involved. If this distribution is, as Robinson postulates, effected by a restricted flow of electrons from one atom to another in the molecule we have, at any rate, a definite picture of the process which the mind can grasp; and if the distribution leads ultimately—as is to be surmised—to the

establishment of polar characteristics at different parts of the molecule, which will determine reactivity at those points, we are in a fair way to reconcile the views of various contending schools and to reach a general hypothesis acceptable to all chemists, and which may even satisfy the physicists. It seems that, despite the organic chemist's proneness and ability to distort the molecules with which he deals, nature has provided a means by which a certain degree of molecular equilibrium can be attained. Nevertheless it will be by the investigation of the conditions leading to the setting up of strain and of the effect produced thereby that we shall gain the most information regarding the chemistry of carbon structures in the near future.

Strainless Systems

It is reasonable to assume that the organic substances that occur in nature as such are produced by means which involve the least expenditure of energy, and that they are, therefore, strainless. Among such natural products there are many containing carbon rings belonging to ring systems which cannot normally be produced without distorting the carbon tetrahedral angles of the component carbon atoms, and thus imparting intramolecular strain to the compounds formed. Nevertheless it is interesting to note the means adopted by nature to relieve this strain and thus to confer equilibrium and stability on quite unlikely ring systems. Ring systems stabilised in this way are found frequently among terpenes; two, namely camphor and pinene, need only be mentioned to illustrate the general method. In camphor the bridged ring is stabilised by the presence of two dimethyl groups, and in pinene, where the junction of the inner ring has to take effect in the position 3, the presence of a double bond on the shoulder of the external ring is necessary. Still more remarkable examples are afforded by more complex natural ring systems.

Biochemistry

In its earliest days the science of organic chemistry dealt only with those compounds which were derived from natural sources, and it was regarded as certain that such substances could only be produced through the agency of life and by no other means. Since then this theory has been shown to be wrong by the preparation in the laboratory of many substances identical with those formed during the operation of life processes. Nevertheless, the more complex substances which nature utilises in building up her animal and vegetable structures still show no signs of yielding the secrets of their constitutions, or the mechanism by which they are produced. Indeed, although we can imitate in the laboratory certain natural operations such as the hydrolysis of starch to glucose, we are still quite ignorant of the means by which glucose is converted, by the appropriate enzyme, into alcohol and carbon dioxide, neither can we imitate this process in the laboratory.

When once the chemist has passed beyond the crystalline and the distillable he enters a region full of difficulties, because he has few means either of purifying the materials with which he has to deal, or of determining their homogeneity when they have been purified. These are the real difficulties which confront the biochemist when he approaches his subject from the structural side of organic chemistry. Biochemistry is in the unique position of being both a descriptive or observational science as well as one of the experimental sciences. From the biological side it has at its disposal the wealth of knowledge acquired by the physiologists and pathologists, and from the chemical side it is in touch with the recorded experience of several generations of organic chemists. If biochemistry is to justify its name it must carry out its function of bringing into line the discoveries of the physiologists with organic chemical structure, for by this means only will it be possible to gain an insight into the chemistry of natural processes which it is the object of biochemistry to discover.

It is far from my object to disparage the wonderful work which has been done and is being done by physiologists and pathologists in their attack on the mechanism of normal and

abnormal life processes. Their record speaks for itself. But too little is being done to approach the problems from the purely organic chemical side, and too few of the people engaged in biochemical research have an adequate knowledge of organic chemistry, or the methods of the organic chemist. The number of organic chemists who are co-operating with biologists in their attack on natural processes is too few. Indeed, the very difficult question arises here as to how best to organise methods for dealing with problems which are essential borderland problems between two great sciences. I do not propose on this occasion to discuss the vexed question of the chemical engineer, but actually the analogy between this hybrid and the biochemist is fairly close. Is the biochemist to be a biologist with a knowledge of chemistry, or is he to be a chemist with a knowledge of biology? I refer, of course, to the method of training required for a man or woman who proposes to take up biochemical research during the fourth year. Given twenty years and the requisite capacity it is, of course, possible for a man to acquire sufficient acquaintance with both sciences to render him an effective worker in the borderland field, although here again the temperament which promotes enthusiasm for research in the experimental sciences and that which leads to initiative in the descriptive sciences is not usually found in the same individual. As knowledge increases the need for specialisation must also increase, because the time factor, that is the time during which it is possible for a student to undergo training, cannot be prolonged beyond a certain period.

Even at the present time it is an open question whether it is possible to give a student a special training in more than one science and in the sciences subsidiary thereto in the time available, and this problem will become more acute as knowledge increases. It has been suggested that we should revert to the older method by which a student was instructed in, say, three sciences without any special training in any one of them, and doubtless this method was a good one for the requirements of those times. But the day of the universalist is past, and general scientific culture has become a luxury of the leisured classes. It is only by the aid of the specialist that, nowadays, we can hope to obtain advances in knowledge either in the sciences or in the sciences applied to industry.

It seems that the best method to attack problems in the borderland subjects is by co-operation between the two types of trained investigators. We are far from gaining any insight into the meaning of life, but it is not unlikely that we shall, in the near future, obtain some information regarding the mechanism of the action of the enzyme, the important agent in the non-living transformation of living matter into chemical products. It may be that organic chemists are waiting to see how Willstätter, who has already made great progress in enzyme chemistry, will surmount the difficulties confronting him, and it may well be that this great organic chemist will introduce new methods of attack which will open up fresh fields for investigation.

Analytical

Except for the substitution of gas for charcoal, it cannot be said that the ordinary methods of analysis employed by the organic chemists have changed much since the days of Liebig. They have been modified, notably by Dennstedt, and more recently some have adopted the microchemical methods introduced by Pregl, but the older methods, for example, the long and tedious process for the estimation of halogens by the method of Carius, are still in vogue in many of our laboratories, and are taught to the students. In any case the usual operation entailed by the estimation of carbon and hydrogen, nitrogen, sulphur and the halogen require considerable time, which has not been materially shortened by the introduction of the less cumbersome methods due to Dennstedt. Pregl's methods, in which a very small quantity of material is used requiring the provision of a special type of balance, have been tried in many laboratories, and have found favour, it is understood, in several of them, more particularly abroad.

But the general experience has been that the technical skill required to obtain good results is acquired only after long practice, and that whereas the methods are useful for gaining an indication of structure when the quantities of material at hand are so small as to necessitate their use, yet when a sufficient quantity of substance is available the older methods are more reliable and more easily carried out. It is interesting

to note that the new methods which have been introduced by Prof. ter Meulen, of Delft, are going to be described to us by Prof. ter Meulen himself, who is fortunately with us at this meeting. Prof. ter Meulen will give an account of his methods on Tuesday morning, and they will be shown in actual operation during the soirée on Tuesday evening. Chemists will then see that a great saving of time can be effected by methods which can not only be used to analyse the small quantities employed by Pregl, but also quantities of 0.1 gm., such as organic chemists have been accustomed to use in the past, and which have been shown to produce the most accurate results.

The Utilisation of Forest Products

The immense number of organic compounds distributed among the plants, trees and grasses which form the forests and jungles of the world, offer a wide field for research which has still much to yield. Our knowledge of the medicinal properties of organic substances and the various uses to which they could be put in the service of mankind did not come to us through any effort of the chemist, but as the outcome of a process of trial and error which is as old as the human race itself. These products were obtained from vegetable materials present in the forests, and as time went on they were extracted in a form possessing some degree of purity, and the plants containing those with specially valuable properties were cultivated for their production. As soon as a theory of organic structure was evolved upon which prediction could be based, these useful products were subjected to close investigation, and in several cases they were prepared by laboratory means. As an outcome several of them, such as indigo and alizarine, were found to be capable of production more economically by the chemical method than by the processes of life, and the natural substances were rapidly replaced by the artificial products. Others still resist all efforts to unravel their structures, and remain still unsynthesised.

Nevertheless it has been by a study of the chemical structure of natural products that much has been learnt regarding the relation between chemical composition and physiological action, and although it may not have been found possible economically to prepare the natural substance itself, the clue revealed by the determination of structure has led to the production of other substances which have not only shown the properties of the natural compound in an enhanced form, but have also exhibited other valuable physiological effects. The determination of structure has, therefore, two objects—to prepare the natural substance and to ascertain the particular arrangement of the atoms in the molecule which confers on it the properties which determine its value. The determination of the structure of indigo led not only to the production of the blue natural indigo, but enabled indigos of every shade of the spectrum to be prepared as commercial products. The determination of the structure of cocaine revealed the molecular complex which conferred on this substance its power to act as a local anaesthetic, and has led to the production of a number of other substances possessing this valuable property, but without the special disadvantages attaching to the use of the natural substance. Examples of this kind are numerous and should be increased. A systematic examination of our forest products would undoubtedly lead to the discovery of many others, and would provide opportunity for the investigation of many other important problems, such as, for example, the utilisation of forest grasses as a source of power alcohol.

Systematic team-work by research organic chemists in close association with botanists is required, and now that the Forest Production Research Board of the Department of Scientific and Industrial Research is in active operation, no doubt this branch of its work will receive attention.

Petroleum

The complex hydrocarbons which form the main constituents of crude petroleum belong to a section of organic chemistry at present too little explored. Although many millions have been made through the production and sale of petroleum products, it is safe to say that the percentage of profit devoted to research in oil products has been infinitesimal. It is true that in the United States large sums are given by the oil interests towards research in other subjects, but until quite recently none of these was, curiously enough, given for the purpose of improving our knowledge of the science on which the utilisation

and isolation of petroleum products depends. The reason is not far to seek. The apparently inexhaustible supplies of petroleum render it unnecessary to devise means for economical working. The crudest and most wasteful methods were employed, because economy and the conservation of the natural product were not paying propositions. This applies not only to the methods used in fractionation, but to those employed for the purpose of "cracking" the higher boiling fractions into liquids of lower boiling point. For at the present moment it is the fraction up to 200° C. which is the important product, because it is the "petrol" of the internal combustion engine.

Time was, before the introduction of this particular machine, when the light fraction from crude petroleum was a drug on the market, and in many cases was actually set on fire at the refinery because no use could be found for it. In those days the chief product was the kerosene fraction which was used as lamp oil. At the present time the rapid increase in the use of the motor car for personal and commercial transport indicates that at no distant period, if progress continues to be made in the same direction, the amount of the "petrol" fraction will be insufficient for the world's needs. This point has already been reached in America, where approximately 70 per cent. of the world's consumption of petrol (gasoline) is effected. During 1925 the consumption of petrol in the U.S.A. approached 800,000,000 gallons a month, which is about twelve times the amount consumed in this country. It has been stated that one in every five persons in the States—men, women and children—possess a motor car, and, be this as it may, it is evident that to meet such a colossal consumption means have to be found to utilise the higher boiling fractions, and indeed even the residues from the distillation processes.

"Cracking"

This "cracking" operation is now carried out on an enormous scale by numerous processes, all subject to patents, but differing from one another but slightly on the question of principle. All depend on the well-established fact that hydrocarbons of high molecular weight will break down into those of lower molecular weight if they are subjected to the requisite degree of temperature. Pressure appears to play an important part in the character of the product, as does also the surface action of the container or material used in the container to promote surface action. All are wasteful, because little or no research has been carried out on the true chemical nature of the cracking operation. Much permanent gas is always produced, consisting for the most part of ethylene and propylene. In the States the ethylene is allowed to go free, because its obvious utilisation in the form of ethyl alcohol is attended with difficulties, but the propylene is usually absorbed in sulphuric acid, and thus converted into isopropyl alcohol, useful as a solvent.

The production of these two unsaturated hydrocarbons provides a clue to the mechanism of the cracking process which is of some significance. If you break a long chain-saturated hydrocarbon one of your products must be an unsaturated hydrocarbon, and it is evident that cracked spirit contains a considerable proportion of such unsaturated bodies. Moreover, the cracking processes at present in use do not produce aromatic hydrocarbons, and it is on the presence of a proportion of these aromatic hydrocarbons that certain special properties of petrol depend. For example, the tendency at the present time is to produce for motor cars internal combustion engines of increased compression ratio, in order mainly to diminish the petrol consumption and thus increase mileage per gallon consumed. For some reason, which research has not yet ascertained, the use of petrol which does not contain the right quantity of aromatic hydrocarbons of the benzene type leads to "detonation," "knocking," or "pinking" when ignited in cylinders giving more than a small compression ratio. This detriment diminishes the value of cracked spirit as such for any but low-compression engines, and many have been the devices suggested in order to overcome this difficulty.

A vast number of substances, selected more or less at random, have been tried as "anti-knock" materials, and as an outcome it has been found that one, namely lead tetraethyl, possesses the property, when present in exceedingly small quantities, of preventing the "detonation" of the explosion mixture in the cylinder. For a time lead tetraethyl (ethyl gas) fell under a ban in the States owing to a fatal accident which attended the

spilling of a certain amount in one of the American factories, but it is understood that further investigation has led to a revision of the view first formed, and that considerable quantities of "ethyl gas" are now being used. The writer remembers visiting Wilmington in 1924, when some 500 gallons of lead tetraethyl were being made daily. Although there was naturally a strong smell of the material in the factory building, and he remained for some hours there, no ill-effects were noticed. It is obvious that the conditions which produce "knocking," and the reason why certain substances are "anti-knock" compounds, and why the presence of aromatic hydrocarbons prevent the phenomenon, must be made the subject of systematic research.

The question is also one of national importance, because in the case of high-compression engines, such as those used in aeroplanes, it is essential that a petrol should be used containing a high percentage of aromatic hydrocarbons. In war time these aromatic compounds will be required for the manufacture of explosives, and it is quite certain that there will not be enough for both purposes.

Nevertheless, it must be remembered that it is only at the moment that the low boiling fraction of petroleum is the chief marketable product. It is probable that progress in the future will tend more and more to produce a motor-car engine of the Diesel type, or one having a carburettor capable of effectively vaporising the higher fractions of petroleum. In these circumstances it may well be that the low fraction will become the less important part of crude petroleum, and that, instead of having to resort to "cracking," a process of synthesis, by which the lower hydrocarbons can be converted into higher ones, will have to be adopted. As a matter of fact, there are methods known by which this can be effected. Pure isoamylene can, for example, be converted into diamylene by interaction with stannic or aluminium chloride, and the process can be carried further, so that perfectly good lubricating oils can now be made by the polymerisation of the lower unsaturated hydrocarbons.

Polymerisation and Depolymerisation

Polymerisation and depolymerisation are, therefore, the two operations which the petroleum industry must investigate and establish on a firm scientific basis by research, so that it may be in a position to supply the public need for any particular form of engine which the engineer may evolve. Especially is it desirable to ascertain under what conditions polymerisation leads to the formation of aromatic and naphthenic hydrocarbons. Considerable attention has been drawn within recent times to what may be termed in general the Bergius processes for depolymerising organic substances. The operation, which consists in heating the material under high pressure in the presence of hydrogen, was introduced in the first instance for the treatment of coal. There can be no question that great and fundamental changes are brought about in organic substances by the treatment whether a catalyst is present or not, and that a wide field for research is opened up thereby, but it is doubtful if, at the moment, general operations of this type can be regarded as commercial propositions. The plant is exceedingly costly and the conditions subject to wide variations which are difficult to control. Actually it has been ascertained that in the "cracking" of the kerosene fraction of petroleum hydrogen is unnecessary, and can be replaced by nitrogen without affecting the character of the final product.

Little is known of the constituents of crude petroleum, or indeed of the fractions into which it can be separated after purification and distillation. Some of the simpler hydrocarbons of the pentane and hexane type have been isolated and the presence of cyclic compounds has been established. Many of them are classed under the head of "naphthenes," but these are of uncertain structure. No doubt many are present in the crude oil, but it is certain that others are formed during the distillation process. It is clear that much opportunity for research work offers itself here, and it is probable that small alterations in the method of distillation may cause deep-seated changes in the character of the distillate, causing it to be of greater service for particular purposes. The occurrence of hydrocarbons of the naphthalene series in petroleum products has also been clearly established. The higher fractions which constitute the valuable lubricating oils also need attention, for it is now certain that viscosity bears

no relation to oiliness, that is, the capacity for acting as an efficient lubricator. The addition of small quantities of "polar" substances of the type of fatty oils or acids confers increased oiliness on these compounds, and although we are now gradually reaching a stage when we know more about the effects of such ingredients, the field for research is still a large and important one.

At present we know nothing about the structure of the hydrocarbons present in the lubricating oils. Indeed, it seems possible that these may not be long-chain hydrocarbon with which the organic chemist is familiar, but rather polymerised products formed from unsaturated components liable to be formed or destroyed under comparatively mild conditions. The relative ease with which the oil in the engine sump of a motor-car loses its oiliness through continued use is not characteristic of the stability usually associated with an organic hydrocarbon.

It is clear that the need for systematic research into the character of petroleum products is urgent, and it is gratifying to note that the Anglo-Persian Oil Company has established a research laboratory at Sunbury-on-Thames, in which the important principles underlying the industry have been and will be studied.

Dyestuffs and Intermediates

Prior to the war Germany manufactured three-fourths of the dyestuffs required for the world's markets. Of the remaining one-fourth, one-half was made from German intermediates and was, therefore, dependent on Germany. Switzerland, although without a domestic source of raw materials, ranked second with about 7 per cent. of the world's production. Great Britain produced about one-tenth of her requirements, and France produced in French-owned and operated plants from 10 to 15 per cent. of her consumption. In order to meet the patent requirements of France and Great Britain, German manufacturers operated plants in those countries where the final assembling operations were completed. The small dye industry of the United States was almost entirely dependent upon German intermediates. At the present time Great Britain produces 80 per cent. of the dyestuffs required for our own use, and we are, therefore, in a position to review the conditions which have led to this remarkable change and to consider the procedure necessary to strengthen it.

It cannot be said that any fundamental advance in the chemistry of the dyestuffs has been made since Bohn discovered indanthrene in 1901, although great advances have been made since then in the preparation of new colours belonging to this and other known series. Consequently the research work necessary in order to establish our position as a dye-making country has been mainly along known lines, involving the extension of reactions which had already been established rather than the discovery of new ones. Nevertheless it is no inconsiderable achievement for our research chemists to have established a position such as that indicated above in so short a space of time, for many of the preparations, the details of which could only be found in the patent literature, had to be worked out *de novo* and the correct conditions found for their adaptation to the technical scale. It is probably along the lines of decreased cost of production that research work in the immediate future will be mostly engaged, and especially is this the case with the intermediate products from which the dyestuffs are derived. Moreover, the intermediate products are of the greatest importance for other industries, for example, the fine chemical industry, the perfumery, and the explosives industries, and any improvement in the processes for their manufacture or the production of new compounds having enhanced value from the commercial point of view is of the greatest importance to all these industries alike.

The parent substances of the intermediate products are the hydrocarbons of coal-tar or the coke oven by-products. The operations required to convert these hydrocarbons into the finished intermediates often involve many stages, any one of which depends for its cost on the purity and yield of the product. When large quantities are involved a difference of 1 per cent. in the yield may lead to a considerable difference in the cost of production, and it is obvious that reactions which yield their products in a state of purity sufficient for the market or further stage production without subsequent treatment make for reduced cost in production. There is thus a wide field for research into the improvement of technical methods which may well occupy the attention of our dyestuffs chemists for some time to come.

On the other hand, the question of fundamental research into new processes, both for the preparation of new intermediates and new dyestuffs must not be lost sight of. The intermediate determines the character of the dyestuff, and it is always possible that a new intermediate may be discovered which will yield a dyestuff with just that difference of shade as to catch the public fancy, and which will lead to the replacement of the older dyestuff on the market. The sulphonic acids of the naphthol, naphthylamines and amino-naphthols are cases in point. These substances are used extensively for the preparation of azo dyes. There are a great number of these compounds theoretically possible, but only a few have found technical application owing mainly to the high cost of producing the others. The high cost is nearly always caused by poverty of yield, an objection which may be at any time removed by the discovery of an improved process.

It is futile to say that the vast field of organic chemistry has been thoroughly explored for the production of new types. At any moment one or other of the men or women engaged in fundamental research may repeat Bohn's discovery of 1901, and obtain a new compound which will be the forerunner of a new series of dyestuffs. It is perhaps too much to ask an industry which is struggling to hold its own to expend large sums on the prosecution of abstract research, most of which will be of no use to it, but it is not too much to expect that the industry will take every means to foster and encourage abstract research in our university institutions, and even to give some lead as to the direction in which its experience leads it to think that advances may be made.

This aspect is of all the more importance at the present time, when organic chemistry is entering on a new phase which will undoubtedly revolutionise many of the existing processes of manufacture. It is now recognised that the presence of a small quantity of a catalyst may either alter the course of a reaction or may lead it to proceed to completion where otherwise a totally inadequate yield would be obtained. The catalyst may either be added or the containing walls of the reaction vessel may act in this capacity. The well-known example of the oxidation of naphthalene to phthalic anhydride by vanadium pentoxide is an example of this, but similar cases are continually recurring, and it has only recently been found that the classical method for preparing ketones by the distillation of the calcium salt of the appropriate acid can be utilised in the most unexpected directions if the thorium salt instead of the calcium salt is employed.

Publications

Our chemical publications grow apace—already they have outstripped in number and size those produced prior to the war. If one may take the Journal of the Chemical Society as representing a standard example, it may be noted that the number of pages published in 1914 was 2,909, whilst in 1923 the number was 3,441. This was reduced in 1924 to 2,698 pages, but rose again in 1925 to 2,986 pages. The drop in 1923-1924 was not, however, due to lack of material but to the exercise of necessary economy because the costs of printing have increased by 70 per cent. since the war, and the funds of the Society could not carry the increased expenditure. The increase is still continuing, and is a welcome sign of the healthy condition in which research in chemistry stands at the present time.

When it is remembered that there are some 23,000 scientific periodicals published throughout the world, the mind stands appalled at the prospect that will confront civilisation even in so short a time as 100 years hence, unless some general method of curtailment is agreed on. The space occupied by our ever-increasing libraries must cause alarm to those who contemplate the possibilities of the future. The agreement between the various societies dealing with chemistry to form a joint library at Burlington House means at the present time an increase of something like 800 volumes yearly—an increase which will augment as time goes on. In the not far distant future the library will occupy the whole of the space available in the society's apartments, and the same problem has to be faced by every other scientific society. Indeed, civilisation seems to be confronted with two ever-growing problems—the increase in its cemeteries and its libraries. The former, no doubt, will be solved by cremation. Is it too much to hope that a judicious exercise of this method may also be applied to our libraries?

Chemistry House

To the Editor of THE CHEMICAL AGE.

SIR,—During the recent Congress of Chemists I was present at a discussion on the above subject. I was very much surprised at the exceedingly narrow way in which the title was interpreted. One of the speakers ventured to touch lightly on the subject of "registration" and was promptly called to order. Surely that is a matter which touches the subject of Chemistry House very closely? There seemed to be a fair unanimity of opinion as to the necessity and desirability of establishing a central building in which to conduct all business relating to chemistry and chemists, but some difference of opinion as to ways and means.

If matters touching the interests of chemists are to be dealt with at a Central House it will be desirable to know just what a chemist is and who are and who are not "chemists." Some standard (other than the mere possession of money) will surely be necessary before one can enter the sacred precincts? Hence it appears obvious that a register of some sort will be forced upon the profession if we ever acquire a Chemistry House. If it does nothing else it will at least distinguish between those who have and have not the *entrée* to that House.

The question of raising the necessary funds for the erection or establishment of the proposed House is indeed a difficult one. The question is made much more difficult by the apathy of what I may call the rank and file of the profession. At present it would appear that the "leaders" of industry consider the project a desirable one, but the rank and file are as yet apathetic.

Until the ordinary chemist is convinced of the utility of Chemistry House and decides he is going to have it, I am afraid it will not come into being. Let us estimate the chemists in this country at the moderate figure of 10,000 (half the number are on the register of the Institute of Chemistry). If this body of men and women really want Chemistry House the funds will be forthcoming in a very short time by the small donations of the individual rather than the large contributions of the few.

In my humble opinion the reason why last week's meeting was so utterly futile and absurd was because nobody could lay a scheme on the table or tell the average chemist what Chemistry House was going to do for him or save for him. A few may still follow the profession of chemistry for the love of learning and the exhilaration of discovery, but the many must follow it to live, and after all majorities do count.—Yours, etc.,

London, July 30.

XXth Century Society of London Graduates

To the Editor of THE CHEMICAL AGE.

SIR,—I enclose a copy of a letter which I am addressing to members of the House of Commons and shall be much obliged if you will give it the publicity of your journal.—Yours, etc.,
G. F. TROUP HORNE, Honorary General Secretary.

[COPY.]

BM/XXTH, LONDON, W.C.1.

July, 1926.

DEAR SIR,—The University of London Bill, now before Parliament, is unique in enjoying the undermentioned combination of advantages: (1) It is based on the Report of the Departmental Committee appointed by the Ministry of Education in Mr. Ramsay MacDonald's Government. (2) It is introduced by Mr. Baldwin's Government. (3) One of the signatories to the aforesaid report is adviser on education to the Liberal Party. In these circumstances it would seem superfluous to trouble you with a communication on the subject.

It appears, however, that from certain quarters where the development of the teaching side of the University has been consistently hampered, misleading statements have been issued to persons who have had little or no opportunity of acquainting themselves with the contents of the Bill. These persons have been requested to write to their Parliamentary representatives urging them to oppose the passing of the measure. The Council of the XXth Century Society of London Graduates think, therefore, that in case some such communications have reached you, it may be of interest to you to read the following resolutions recently adopted by the Society:—

"The XXth Century Society of London Graduates welcomes the Report of the Departmental Committee on the University of London (Cmd. 2612) and expresses the hope that the Government will take action on the general lines of the Report. They note with satisfaction (a) the inclusion of representatives of the principal Colleges on the Senate; (b) the assurance that the External Degree is in no danger; (c) the principle of delegation of executive functions. They attach importance to the retention by the Senate of its present powers, and, on the point at issue between the Majority and Minority Reports, they suggest for consideration by the Statutory Commission the possibility of establishing a Financial Council with a statutory constitution, subordinate in general to the Senate, but with the powers proposed by the Majority Report of negotiating with grant-giving bodies and of final allocation of grants. They trust that the Statutory Commission will be required to act in consultation with the authorities of the University and will have discretion to vary the recommendations of the Report in matters of detail."—Yours, etc.,

A. H. GWYNNE-VAUGHAN,
Chairman of the Council.

German Patents

To the Editor of THE CHEMICAL AGE.

SIR,—I hope that it is only the result of the strain of the Chemists' Congress that has taken the edge off the judgment and vigilance of your leader writers in the issue of July 31. In one leader the following lines occur:—"... the time-honoured ruse of the German—and possibly a quite legitimate one—is being resorted to, namely, the direct withholding from specifications of some of the salient features so as to render them of little use to those in other countries who may have predatory intentions." It is against the words "and possibly a quite legitimate one" that I protest, on behalf of the good name of your journal and also of common honesty. For you are saying that it is possibly quite legitimate for one side to put forward an imperfect or a worthless document on the basis of which a contract may be drawn up. The nature of this contract is very clearly described in a later leader:—"The taking out of a patent is a bargain, in which there is a *quid pro quo*. In return for a monopoly for a limited period the patentee takes the public into his confidence and divulges the details of his invention." In this country, at any rate, time cannot honour trickery and swindling (although your leader insinuates that it can elsewhere); but your contemplation of the deed in a spirit of complacency and toleration would be distressing and alarming if it were not that I feel sure that it is only a symptom of fatigue.—Yours, etc.,

London, July 31.

PERCY E. SPIELMANN.

Silica Tubing

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the Thermal Syndicate's letter to you under the heading "Silica Tubing," page 51 of July 17 issue, *re* their carrying out repairs, may we beg leave to point out that, carrying as we do, enormous stocks of new perfect silica-ware at half-price, this material should prove a more economical alternative to repairing where we have the particular size required in stock.

We believe this fact will interest potential users of this class of tubing and lead them to experiment or make use of it in a larger number of cases if they can be assured that they can replace in many instances at such economical rates. Also they could test out with material ex our stocks, even if they intended to order the complete plant with the makers.—Yours, etc.,
King Street Warehouses, Bury.

August 4.

HUBERT JONES.

Natural or Synthetic Indigo

To the Editor of THE CHEMICAL AGE.

SIR,—Can any of your readers inform me whether natural indigo can be described as superior to the artificial product, prepared from phthalic anhydride or by other methods? The only difference between the natural and synthetic substances appears to lie in the nature of the impurities present, but the natural product still seems to be preferred by dyers.

—Yours, etc.,

C. K. RAYNER.

18, Ashlake Road, Streatham, S.W.16.

August 4.

Some Recent Views on Catalysis

Results of American Research

By the courtesy of the Editor of "Discovery" we are enabled to reproduce part of an article on "Contact Catalysis and the Mechanism of Chemical Reactions," by Professor William Foster, of Princeton University, U.S.A. The article appears in full in the July issue of "Discovery," and deals especially with the views and work of Professor H. S. Taylor and his colleagues at Princeton.

CATALYSTS are adding greatly to the wealth of nations. We have excellent illustrations of this fact in the Haber process for producing ammonia, and in the use of nickel in the hydrogenation of animal and vegetable oils, or the production of solid fats. Three hundred million pounds of oil are being hydrogenated annually by catalytic processes in the United States of America, producing fat equal to that obtained from 7,000,000 hogs. Hydrogenation adds over £4,000,000 annually to the value of American cotton-seed oil. Germany, in 1925, exported Haber products valued at more than £4,000,000. Millions of tons of contact sulphuric acid are produced every year. Comparatively little is known about the real nature of contact catalysis and the mechanism of chemical reactions. Various hypotheses have been advanced, but most of these have not been satisfactory.

Professor Hugh Stott Taylor and his co-workers of Princeton have carried out a great deal of experimental work on catalysis, and a most interesting theory of the catalytic surface has been developed. It has been discovered that a catalyst surface, such as that of nickel, shows a *varying capacity* to adsorb gas and to promote catalytic change. While the body of a granule of the catalyst is crystalline, *i.e.*, has an ordered arrangement of atoms, it appears that here and there, on the surface of a mainly crystalline granule, there are groups of atoms in which the process of crystallisation is not yet complete. According to Professor Taylor, the following representation of a cross-section of a minute portion of such a granule of nickel may serve as an illustration of such an incomplete stage in the crystalline process :

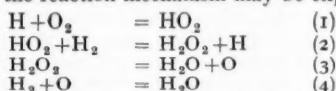
attached to the granules by two constraints, two such molecules might be adsorbed. This concept introduces a mechanism whereby both the constituents of a hydrogenation process may be attached to one and the same nickel atom.*

Likewise, the activation of platinum and silver gauzes in catalytic oxidation is believed to be due to a production, by disintegration of the plane-surfaced wire, of metal atoms to a large degree unsaturated and detached from the normal crystal lattice of the metal, and capable of adsorbing several molecular reactants. The notion that certain metal atoms are more or less detached from the normal crystal lattice accords with other observations. These outer atoms should have a greater freedom of motion, and should be relatively sensitive to the influence of thermal change. In the case of nickel, for example, the metal is very sensitive to the influence of heat, whereby marked sintering occurs, indicating that the process of crystallisation is incomplete. It is well known that certain metal catalysts, e.g., platinum in the contact process for sulphuric acid, are easily "poisoned" by foreign matter, and their action thereby inhibited. According to the Princeton view, "it is the less saturated catalyst atoms in the surface which will be the preferred positions of attachment of adsorbed catalyst poisons. As the quantity of poison increases, more and more of the surface atoms will be covered with poison. In the final issue the whole surface will be covered."

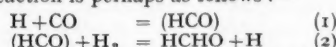
Reactions Involving Gases

As to the mechanism of certain reactions involving gases made up of diatomic molecules, there is evidence that in the presence of catalytic metals some of the gas is present in the atomic condition on the surfaces of the catalysts. To illustrate this, there is proof that atomic hydrogen is present on nickel and on copper, and that both diatomic hydrogen and nitrogen molecules yield the corresponding element in the atomic state in the presence of iron. The abnormal activity of monatomic hydrogen is of importance in the problem of hydrogenation catalysis.

Taylor and Marshall have employed, in their work on hydrogenation, hydrogen atoms formed by collision of excited mercury atoms and hydrogen molecules, the hydrogen atoms being produced by allowing hydrogen molecules (H_2) to collide with mercury atoms excited by resonance radiation emitted by a cooled mercury arc. It has been demonstrated that hydrogen and oxygen, in the presence of excited mercury vapour, interact to form both hydrogen peroxide (H_2O_2) and water (H_2O), the former being the primary product. To account for the rapid reaction between the hydrogen and oxygen, the reaction mechanism may be explained thus:—

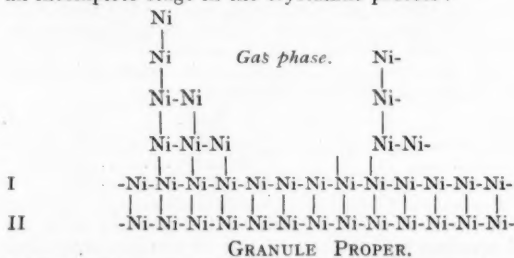


A hydrogen atom is regenerated in the second reaction of the sequence, and we have, therefore, a "chain mechanism." In order to obtain an optimum yield of hydrogen peroxide, the concentration of hydrogen must be as high as possible. Thirty to forty molecules of peroxide are formed for every quantum of light absorbed by the mercury vapour. Taylor and Marshall have also succeeded in producing formaldehyde (HCHO) by the interaction of carbon monoxide and hydrogen in the presence of excited mercury atoms. The mechanism of the reaction is perhaps as follows:—



The quantum yield of formaldehyde is about the same as in the case of hydrogen peroxide, namely, thirty to forty molecules of aldehyde for every quantum of light adsorbed by the mercury vapour.

[That is to say, the loose atoms at the surface of the catalyst serve as links in effecting a union between atoms or molecules of substances which do not readily react or unite in the absence of the catalyst.]



Diagrammatic representation of a portion of a granule surface in cross-section.

Action of Surface Atoms

The atoms in the second layer (II) of the granule proper will be surrounded on six sides by other nickel atoms. The atoms in the surface layer will be surrounded by neighbouring metal atoms in all directions except that towards the gas phase. The degree of constraint or saturation imposed by this orderly arrangement of atoms becomes progressively less and less as we proceed outward from the granule proper (I and II) towards the most exposed metal atoms. Thus, the uppermost nickel atoms in the above representation suffer only one constraint by reason of their single attachment to the nickel atom immediately below. Further, we may note that the atoms in the edge of a granule have one less degree of saturation than those in the surface proper; atoms at a corner have two less than those in the surface and one less than those at an edge. A surface of a granule may thus be regarded as composed of atoms in varied degrees of saturation by neighbouring metal atoms, varying from those one degree less saturated than interior atoms to those which are only held to the solid surface by a single constraint. It is by this constraint alone that these outermost atoms differ from gaseous metal atoms. A gaseous atom of nickel can combine with four molecules of carbon monoxide to form nickel carbonyl. It is not therefore improbable that exposed nickel atoms, held by only a single valence to the solid surface, shall have a capacity to attach to themselves or adsorb three molecules of carbon monoxide or, alternatively, three molecules, the bonding between which and the nickel atom is identical with that obtaining in nickel carbonyl. With the metal

[That is to say, the loose atoms at the surface of the catalyst serve as links in effecting a union between atoms or molecules of substances which do not readily react or unite in the absence of the catalyst.]

Indian Chemical Notes

(FROM OUR OWN CORRESPONDENT.)

As the U.P. pottery industry has for some time been showing decay, a new scheme to revive the industry has been put forward and provisionally sanctioned. This provides for the opening of two classes at the Benares University. The higher of these two classes is designed to train instructors in the pottery industry and managers of business concerns, and the students will be given a two years' course. The lower class will be for artisans, who will have a six months' course of instruction. It is hoped that by these methods a supply of instructors and operatives will be forthcoming through whose agency it will be possible to carry out more ambitious schemes for the encouragement of the pottery industry.

A new company has been started in Madras for the manufacture of glass. The company is known as the National Glass Works, Ltd., and its capital is Rs.50,000. The enterprise seems to have every prospect of success. The glass factory is already in course of construction, and will be completed by August next. The *tasar* silk industry in Bihar has been, according to a report of the Industries Department, declining for some years past, owing to want of organisation. More than 75 per cent. of the handlooms which used to weave *tasar* are now engaged in weaving imported spun silk. The rearing of the insect from which *tasar* silk is obtained cannot be domesticated, and is thus in the hands of jungle tribes. The Government intend taking action to revive the industry.

Imports of Dyes

The total import of coal tar dyes into India declined from 18½ million lb. in 1924-25 to 10 million lb. in 1925-26. The decline is entirely to the account of Germany. The United Kingdom increased her share from 677,000 lb. to 1,055,000 lb., and the United States from 643,000 to 1,572,000 lb. The cause of this abnormal decline is not yet correctly known.

In a lecture in Bombay, the Reverend Father Caius, of the Haffkine Institute, Bombay, and Director of the Pharmacological Laboratory there, traced the history of the research in Indian medicinal plants, and spoke of the large fields for further research. A number of medicinal products such as valerian, squill, datura, aconite, colocynth, juniper, digitalis, belladonna and jujube can be prepared, in his opinion, in India. He thought that all the Provincial Governments should take concerted action in this matter instead of each working independently. The Dunlop Company is floating an Indian company for increasing its business in India. The amount open to subscription is Rs.30 lakhs, and shares will be issued simultaneously in all centres of trade in India. The company is already doing a very large business in India, and this new company will further extend its activities.

Paper from Bamboo

A new enterprise for the manufacture of paper from bamboo, known as the Cuttack-Angul project, has been started in Northern India, which proposes to extract bamboo from the Angul forest and float it down the Mahanadi River to a manufacturing site at Cuttack. The bamboo in question has been subjected to extensive trials in the Dehra Dun factory, and the results obtained are as follows: (1) reduction by the fractional sulphate of soda method with 18 to 19 per cent. of soda salts on weight of bamboo, with a yield of unbleached pulp of 45 to 46 per cent.; (2) bleaching with 9 per cent. stand bleaching powder on unbleached pulp, equal to 4 per cent. on bamboo, with a bleached yield of 40 to 41 per cent. on the original bamboo weight. These results, coupled with the low cost of bamboo and the proximity of a coal field, give a total manufacturing cost, inclusive of depreciation and the freight of product to Calcutta, of about Rs. 75 per ton.

The Strike and Industry

FURTHER difficulties are being experienced in many works as a result of the strike, although in a number of cases it has been possible to reopen factories after a period of idleness. Among those which have not been able to carry on are the South Wales steel works at Llanelli, which have had to close down owing to the shortage of material, rendering four hundred workpeople idle; and the Essex silk factories of Courtauld's, which have closed for a fortnight, affecting 2,000 workpeople. The Brymbo Steelworks and Baldwin's King's Dock tinplate works at Swansea have resumed operations.

New Sulphate of Ammonia Prices

IN a circular dated July 31 issued by the British Sulphate of Ammonia Federation, in reference to prices of sulphate of ammonia for home agricultural use during the coming season 1926-27, it is stated:—

"Owing to the coal stoppage our production has been greatly reduced and is fully sold until the end of August. For this reason September is the earliest month for which we are quoting prices to farmers. Our new prices represent a reduction of about £1 per ton or 7½ per cent. as compared with last year's prices. The unit of nitrogen in sulphate of ammonia at the average of these prices costs about 11s., so that nitrate of soda containing 15 per cent. of nitrogen would have to be sold at £8 ros. 6d. per ton delivered to your nearest station to be on the same level. Even if there is an early resumption of work in the coal mines it will take many months for the coke-ovens to reach their normal output of sulphate of ammonia again, and for this reason we cannot guarantee that sufficient supplies will be available in any given month. It is, therefore, desirable that orders should be placed with us immediately for the whole of the season. We reserve the right to raise our prices at any time by sending out a printed notice to that effect. Any such increase in price will apply to all orders received after date of issue of notice.

"In response to numerous requests from farmers and others that we should simplify our method of pricing sulphate of ammonia, we have decided in future to guarantee a minimum percentage of 20.60 nitrogen for neutral quality, instead of selling on the basis of 21.10 per cent. with reductions in price for any deficiency. As the bulk of our deliveries will continue to contain from 20.90 to 21.10 per cent. of nitrogen, the alteration in the guarantee will not involve any lowering of quality, but will serve to standardise the price. We have also decided to abolish the allowance for taking delivery ex works and instead to sell any quantity from 1 ton upwards ex works at the same price as a 4-ton lot carriage paid to buyer's station. Lots of less than 4 tons delivered by rail or water will be charged for at the higher rates set out in Clause. As practically no ordinary quantity is likely to be available, we refrain from quoting a price for this quality.

"We offer to sell sulphate of ammonia for home agricultural use at the following prices for delivery in:—

1926.	£	s.	d.	1927.	£	s.	d.
September	11	7	0	January	11	15	0
October	11	9	0	February	11	18	0
November	11	11	0	March	12	1	0
December	11	13	0	April/May	12	1	0

per ton for neutral quality guaranteed to contain 20.60 per cent. of nitrogen by weight and not to contain more than 0.025 per cent. of free acid and to be in readily friable condition at the time of delivery, delivered to consumer's nearest station or wharf in Great Britain (or f.o.b. British port when the ultimate destination is Isle of Man) for prompt cash payment in lots of 4 tons and upwards, packed in single bags containing about 2 cwt. net to be supplied free by sellers, tare allowed. When credit is given, a reasonable extra charge may be made, but the discount allowed for prompt payment should be quoted on the invoice. The above prices will also apply to deliveries of 1 ton and upwards ex works or ex store to buyers' road vehicle."

Price of Coal for Other Industries

MR. ROSCOE BRUNNER (chemical trades), Sir William Larke (Iron and Steel Federation), Mr. David Brenner (British Engineering Association), and Mr. Arthur Dorman (iron and steel) were among the representatives of the big industries who presented their views on the effect that a non-economic settlement of the coal dispute would have on the other great industries of the country at a meeting of the Industrial Group of the House of Commons, on Wednesday, July 28, Sir Arthur Shirley Benn presiding. They urged that no settlement should be approved which involved an addition to the price of coal used in industry. It was pointed out that the industries represented were responsible for the consumption of 20 million tons of coal annually, and any addition to the price would mean additional production costs, which would constitute a serious handicap. It was decided to see the Minister of Labour and to convey to him the substance of the representations made to the Group. About sixty M.P.'s were present.

Chemical Matters in Parliament

Gas Warfare (Defensive Respirators)

Mr. Ammon (House of Commons, July 27) asked the Secretary of State for Air whether, having regard to the developments of gas warfare which had taken place since 1918 and the relative ease with which enemy aircraft could attack London with gas and other bombs, and the risks to which the civil population would be exposed, he would take immediate steps to ensure that every man, woman and child should be supplied with a defensive gas respirator and to arrange that thorough instruction in its use should be given in schools.

Sir S. Hoare, replying, said he would refer the hon. member to the reply given by the Prime Minister to the hon. member for Attercliffe (Mr. Cecil Wilson) on February 10.

Mr. Ammon (House of Commons, August 2) asked the Prime Minister whether a gas mask sufficiently reliable to resist the newest discoveries in gases for use in warfare had been invented; and what steps did the Government propose to take to bring such to the attention of the civilian population and to provide instruction in the use of such protective measures?

The Prime Minister replied that there was every reason to believe that protective measures were keeping abreast of current developments in gas warfare. As regards the second part of the question, he had nothing to add to the answer which he gave to the hon. Member for Attercliffe on February 10.

Indian Match Factories (Employment of Children)

Earl Winterton (House of Commons, August 2), replying to Mr. Young, said that all the provisions of the Factories Act applied (a) to all factories where power was used and at least 20 persons were employed, and also (b) to other places (where at least 10 persons were employed) declared to be factories by the Local Government. The Bombay Government's declaration related to places where splints were converted into matches, and at least 20 persons were employed. The Government of Burma had taken similar action in regard to match factories employing at least 10 persons. So far as the available information showed, no declaration affecting match factories had been made by other Local Governments.

Smokeless Fuel

Mr. Connolly (House of Commons, August 3) asked the President of the Board of Education whether he could report on the work done by the fuel research station with regard to the discovery of a smokeless fuel suitable for domestic purposes?

Lord Eustace Percy said work on the production of smokeless fuel was progressing steadily at the Fuel Research Station so far as the coal shortage would allow. The whole question was discussed in the Annual Report of the Director of Fuel Research for 1925, which would be published during the autumn. Developments during 1926 had been promising, and would be dealt with in a special report.

Sir H. Brittain inquired if this was purely on a laboratory scale, and could he say how much coal was used?

Lord E. Percy said he supposed it was not a question of the amount of coal, but of the quality of the various coals experimented with.

Agriculture (Liming)

Lieut.-General Sir Aylmer Hunter-Weston (House of Commons, August 3) asked the Secretary of State for Scotland whether, in view of the difficulty of obtaining lime for agricultural purposes at an economic price in the south-west of Scotland, he would consider the advisability of encouraging the quarrying of lime, which is obtainable in large quantities in the Island of Arran, in a position near the sea whence it could be cheaply shipped to all parts of the south-west of Scotland and the north-west of England?

Sir John Gilmour, replying, said he appreciated that a considerable acreage of land in Scotland was in need of lime, and he had reason to suppose that there was a growing recognition among farmers of the fact that the departure from the former practice of regular liming was a mistake. He had been furnished with some particulars regarding the deposit of limestone in Arran referred to in the question. He could not in present circumstances hold out a prospect that the Board of Agriculture would have funds available for financial assistance to such enterprises, but he would welcome any developments which had the effect of increasing the supplies of lime for

agricultural purposes, and he would be glad to give them such encouragement as was in his power.

Sir Robert Hamilton asked if this matter could not come under the agricultural survey?

Major MacAndrew asked if the answer of the right hon. gentleman meant that no money was likely to be given for liming?

Sir J. Gilmour said he could not make any definite promise on the subject. In regard to the survey, they were getting some information.

Mr. Hardie inquired if while the survey would take years the right hon. gentleman was aware that there were quarries in the agricultural areas where they were working limestone, and that heaps of it were lying about, and would he get information from the agricultural areas as to these quarries?

Sir J. Gilmour said if the survey was to be of practical use, it must be a scientific one.

Institution of Fuel Technology

First List of Officers

At a meeting on March 5, at the Institution of Civil Engineers, it was resolved to found an institution of Fuel Technology; an organising committee being given the task of preparing a constitution. On Friday, July 30, Sir William Larke presided over a second meeting to receive the report of the work of the committee.

A letter was read from Sir Alfred Mond, who has accepted the office of president, expressing regret at his inability to attend, and saying: "The work which the Institution has set itself to do is of the utmost importance to industry, and indeed to the whole commonwealth. Under the conditions in which the country has been existing during the last few months, public interest has become more and more concentrated on the problems which the Institution has been formed to solve."

On the motion of Mr. L. C. Harvey, seconded by Mr. S. H. North, it was resolved to adopt as the name of the organisation "The Institution of Fuel Technology."

Sir Richard Redmayne, in moving that the constitution as drafted by the organising committee should be adopted, said cheap fuel, in whatever form it was used, was the basis of our national supremacy, and it was most important that we should use fuel to the best possible advantage of the community.

The proposal was seconded and carried. The following were elected to the offices specified:—President: Sir Alfred Mond; Vice-Presidents: Lord Aberconway, Professor Harold Bailly Dixon, Sir Robert Abbott Hadfield, Lord Weir, and Mr. D. Milne Watson; Council: Mr. R. A. Burrows, Sir Philip Dawson, Mr. F. A. Freeth, Sir W. J. Larke, Mr. Rudolph Lessing, Mr. M. Mannaberg, Sir Edward Manville, M.P., Mr. S. McEwen, Lord Montagu of Beaulieu, Sir Richard Redmayne, Admiral Sir Edmund Slade, Mr. Wallace Thorncroft, Mr. M. W. Travers, Professor R. V. Wheeler, Mr. W. A. Woodeson, Mr. G. R. Thursfield, Mr. T. Hardie, Mr. A. H. Middleton, and Mr. W. M. Selvey; Hon. Treasurer: Sir William B. Peat; Hon. Secretary: Mr. Edgar C. Evans, Caxton House (East), Tothill Street, S.W.

It was left to the council to fix a date for the autumn or winter meeting, when, it was stated, papers of considerable importance would be read.

Japanese Tribute to British Steel

An expert committee in Japan has investigated the life of rails laid in Japanese railways during the past 54 years. The committee found that, while rails from America, Belgium, Germany, and Japan showed a life ranging from ten to forty years, British rails at the end of that period showed no sign of breakage, and the Japanese have consequently decided that in future none but British rails shall be specified for their railways. The attitude of this expert committee may be contrasted with that of many British municipalities in recent years, which have ordered rails from abroad with the object of making an immediate saving, in spite of the ultimate advantage of using the best British rails, even at a slightly higher cost.

From Week to Week

MR. AND MRS. ROBERT MOND have gone to Dinard, where their address will be 38, Boulevard Feart.

THE GAS LIGHT AND COKE CO.'S BILL was read a third time in the House of Lords on Thursday, July 29.

MR. F. C. WILLIAMS has been appointed secretary of the British Oil and Cake Mills, Ltd., in place of the late Mr. Morton Lambert.

A NEW RAPID-HARDENING CEMENT, which hardens to great strength in 24 hours, was exhibited at the Yorkshire Agricultural Society's Show.

TENDERS FOR THE ERECTION OF A CHEMICAL PLANT are said to have been asked for by the company which has acquired a site near Wigg's Works, at Runcorn.

THE BIRMINGHAM SECTION OF THE BRITISH INDUSTRIES FAIR may have a separate building for Sheffield providing that sufficient firms from Sheffield exhibit.

FRANK HAWKING, a scholar of University College, has been awarded the scholarship in pharmacology by the Master and Fellows of University College, Oxford.

NEWS RELATING TO THE JAPANESE DYE IMPORTS CANCELLATION affecting the import of German dyes recently caused a strong demand for Dye Trust shares on the Bourse.

MR. AND MRS. HENRY MOND have gone to Le Touquet, and will be away for about six weeks. All correspondence sent to their London address, 45, Green Street, Mayfair, will be attended to.

DR. H. H. DALE, head of the Department of Biochemistry and Pharmacology under the Medical Research Council, has been awarded the Edinburgh University Cameron Prize in practical therapeutics.

PLEADING GUILTY TO A CHARGE OF STEALING COKE from the United Alkali Co.'s Sullivans Works, two youths, John Slaviski (25), and James Twigg (23), and two others, were each fined 10s. at Widnes Police Court, on Monday, July 26.

THE RETIREMENT OF PROFESSOR J. A. FLEMING, F.R.S., from the chair of electrical engineering of University College, London, is to be signalled by the presentation of his portrait to the college. A committee, presided over by Mr. A. A. Campbell Swinton, is inviting contributions for the purpose. Contributions should be sent to Professor W. C. Clinton, University College, Gower Street, London, W.C.1.

THE DEGREE OF DOCTOR OF SCIENCE of the University of Edinburgh has been conferred upon Dr. D. A. W. Fairweather for a thesis on "Electro-synthesis"; upon Mr. J. D. M.B. Ross for a thesis on "A Relationship between the Associating Power of Optical Isomers, and the Formation of Racemic Compounds"; and upon Dr. G. Shearer for a thesis on "The Application of the Method of X-Ray Analysis to the Study of the Organic Aliphatic Series."

A NUMBER of eminent scientific workers from countries outside the British Empire have been invited to be guests of the British Association during the Oxford meeting. Among chemical workers who have accepted the invitation are: Professor F. W. Clarke, Chief Chemist to the United States Geological Survey; Professor C. Runge, of Göttingen, the eminent spectroscopist; Professor J. A. Christiansen, of the University of Copenhagen; and Professor H. ter Meulen, of Delft.

THE SECRETARY FOR MINES announces that he has appointed Professor Jocelyn F. Thorpe, C.B.E., F.R.S. (Professor of Organic Chemistry in the Imperial College of Science and Technology), to be chairman of the Explosives in Mines Research Committee, in the place of Sir Frederic L. Nathan, K.B.E., who has resigned; and Mr. F. E. Smith, C.B., F.R.S., Director of Scientific Research under the Admiralty, to be an additional member of the Committee. The secretary to the Committee is Mr. G. B. Brown, Mines Department, Dean Stanley Street, Millbank, London, S.W.1.

DR. DOROTHY JORDAN LLOYD, of Newnham College, who has been awarded an international travelling fellowship of £500 at the fourth biennial International Conference of University Women, which came to a close at Amsterdam on Tuesday, holds a Fellowship at Newnham College, is an M.A. of Cambridge University, a D.Sc. of London, and a Fellow of the Institute of Chemists. For the last five years Dr. Lloyd, whose special field is bio-chemistry, has been associated with the leather chemists at the Lister Institute, London. She has recently published a book on *The Chemistry of Protein*.

THE REPORT OF THE CHEMICAL AND METALLURGICAL CORPORATION for 1925 deals mainly with the reorganisation and reduction of its capital, which the Court has sanctioned, and its acquisition of the outstanding holdings in American and Mexican subsidiaries. Additional plant, it appears, has been installed at the Stratford works, a new process has been thoroughly tested, and both intermediate and finished products have been sold. "It is obvious, however," the directors state, "in the light of their most recent knowledge, that the site at Stratford does not afford proper facilities for future expansion. A site on the Manchester ship canal has, therefore, been secured, where ample facilities obtain for the assemblage of raw material for their conversion and for the ready disposal of the products and residuals."

LEVER BROTHERS are reported to have acquired extensive premises at the North Wall, Dublin, for the opening up of a large soap works.

AS PART OF THE PROCESS OF "RATIONALISING" the Höchst Farbwerke at Frankfurt, belonging to the German Dye Trust, will dismiss some 600 workmen within the next few weeks.

THE SCARCITY OF BENZOL IN ENGLAND has led to the placing of large orders in Germany, and as a result, a considerable increase in demand is reported, although the price remains unchanged.

MR. W. G. HUMPHREY has obtained first class honours in chemistry at Oxford. He was educated at King Edward VII. School, Sheffield, from where he won a Science Scholarship at Queen's College, University of Sheffield.

PLEADING FOR FURTHER INTER-TRADING RELATIONS between Portugal and Great Britain, the president of the Portuguese Chamber of Commerce and Industry recently stated that chemicals, etc., of British manufacture had preference in Portugal.

WITH REFERENCE TO AN ACTION for alleged libel brought by Bovis, Ltd., against Mr. Thorne and other officers and members of the London Master Builders' Association, and recently heard in the High Court of Justice, we understand from Bovis, Ltd., that a notice of appeal against the judgment in this action has now been lodged on their behalf. The appeal is expected to be heard in October next.

A GERMAN MATCH COMBINE has been formed and steps are being taken to reorganise the match industry. A 25 year agreement has been concluded between the various works, including those owned by the Swedish Match Trust, in accordance with which a company has been formed to regulate the output and selling prices of the allied factories. Its capital of 1,000,000 marks is entitled to a maximum annual dividend at the rate of 6 per cent.

RECENT WILLS INCLUDE: Mr. Sam Dyson, of St. Anne's-on-the-Sea, Lancs, head of James Dyson and Sons, soap manufacturers of Elland, Yorks, £9,543.—Mr. Isaac McDougall, of Chester, chemical manufacturer, £102,351.—Mr. Harold Smalley Willcocks, of Hale, Cheshire, founder of H. S. Willcocks, Ltd., of Manchester, indigo, chemical, and metal merchants, £18,051.—Mr. Alexander Milne Ogston, of Ogston and Tennant, Ltd., soap manufacturers, £376,663.

THE BEET SUGAR GROWERS of Saxony use an artificial dressing composed of about 3 cwt. sulphate of ammonia, 2 cwt. superphosphate, and $\frac{1}{2}$ cwt. of potash, applied before sowing the seed. After the "singling" of the plants, 1 to 2 cwt. of nitrate of soda is applied. Farmyard manure is used in the autumn, in conjunction with deep ploughing. Soils are carefully tested for acidity, as sugar beet will not grow on land deficient in lime, and where this is found to be lacking liberal dressings are given before planting.

THERMIT, LTD., a constituent company of Nobel Industries, Ltd., are transferring their works from Church Road, Battersea, to more commodious premises at Angel Road, Edmonton, London, N., where the larger area of factory space available will enable them to cope with the increasing demand on their resources. Thermit, Ltd., also carry on the business of the late Continuous Reaction Co., Ltd., of Newton Works, Hyde, Cheshire, and will in future manufacture at their Edmonton works the "Conreacto" brand of ferro-tungsten and other metals and alloys. On and after August 9 all communications for Thermit, Ltd., should be addressed to Angel Road, Edmonton, London, N.18. Telephone: Tottenham 3130.

THE MANCHESTER CITY COUNCIL and the Council of the University of Manchester have approved the appointment of Mr. Dempster Smith, M.B.E., M.Sc.Tech., M.I.M.E., to the Chair of Mechanical Engineering in the University and in the College of Technology in succession to Professor G. Gerald Stoney, D.Sc., F.R.S., who has resigned the Chair in order to take up an important appointment in industry. Professor Dempster Smith, who has been a member of the staff of the Mechanical Engineering Department of the College for upwards of 20 years, has also had long and wide practical works experience, in addition to which he has maintained a close connection with industry during the period of his Lectureship in the College. He was awarded in 1922 the Telford Premium by the Institution of Civil Engineers, in 1923 the Bernard Hall Prize by the Institution of Mechanical Engineers, and in 1924 the Constantine Medal by the Manchester Association of Engineers.

Obituary

MR. JAMES STEWART, for several years editor of *The Gas World*, and a well-known journalist who had served on the *Glasgow Herald* and the *Manchester Guardian*. When *The Gas World* (of which he was the principal proprietor) was acquired by Benn Brothers, Ltd., he became a director of the latter company, and retired in 1918.

GASTON DANNE, of Gif, aged 41, a victim to the action of radium. He was director of the Laboratory of Experimental Radioactivity at Gif, and formerly a collaborator of Professor Curie, the discoverer of radium. In pursuing the study of radioactive substances, which has finally cost him his life, Danne was following the example of his father, who was Curie's first assistant.

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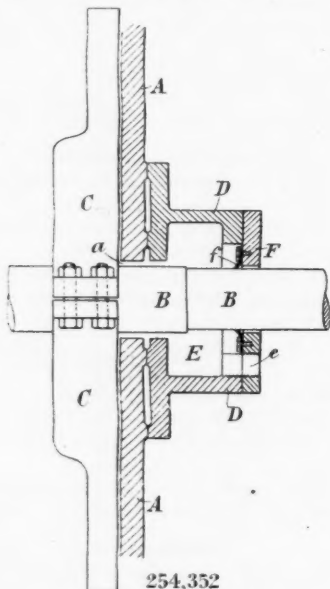
Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each

Abstracts of Complete Specifications

- 254,352. LEAD OXIDE, APPARATUS FOR THE MANUFACTURE OF. H. Waring, Cambridge Road, Great Crosby, Lancaster. Application date, January 30, 1925.

In the manufacture of lead oxide by treating molten lead with a current of steam or air, the lead is agitated by beaters mounted on a shaft passing through the side of the vessel. The object is to avoid the use of packing material for the shaft, and



thus to avoid the loss of oxide dust due to worn packing. Each aperture *a* in the side of the vessel *A* is provided with an air chamber *E* through which passes the shaft *B* carrying the beater *C*. The air chamber is provided with a cover *F* having a flexible washer *f* to make an airtight joint with the shaft *B*. Air or steam is passed into the chamber *E* through an inlet *e*, so that any lead oxide in the chamber *E* is driven back through the opening *a* into the vessel *A*.

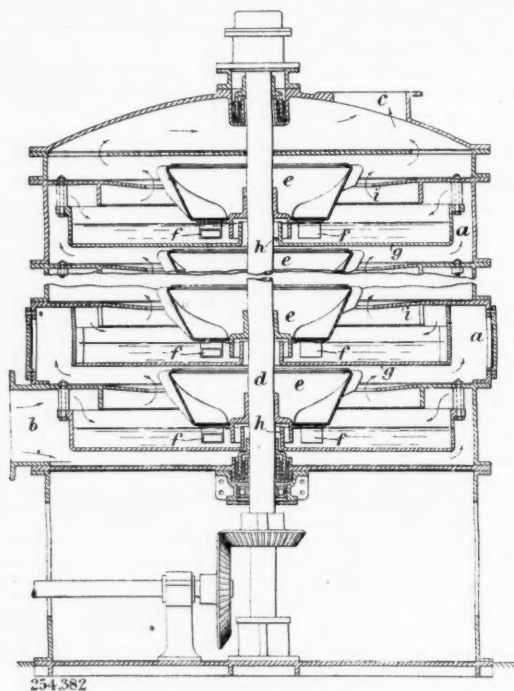
- 254,402. NAPHTHYLAMINE SULPHO ACIDS, MANUFACTURE OF. E. F. Ehrhardt and R. M. Hereward, 70, Spring Gardens, Manchester. Application date, April 4, 1925.

α -nitro-naphthalene is treated with sodium sulphite or a mixture of sodium and ammonium sulphites which is obtained by neutralising sodium bisulphite with ammonia. The mixture is heated in an autoclave for four hours to 130°–140° C. The product is filtered, the excess of ammonia driven off, and the liquid acidified with hydrochloric acid. Naphthionic acid separates out and is collected by filtration. 1:5-naphthylamine-monosulpho-acid crystallises out and the liquor contains a further quantity of naphthylamine-sulpho-acids. A good yield of 1:4-naphthylamine-sulpho-acid and 1:5-naphthylamine-sulpho-acid is obtained.

- 254,382. EFFECTING INTIMATE CONTACT BETWEEN LIQUIDS AND GASES, APPARATUS FOR. Kirkham, Hulett, and Chandler, Ltd., S. Hersey and F. W. Stokes, 37, 38, Norfolk House, Norfolk Street, Strand, London, W.C.2. Application date, March 31, 1925.

This apparatus is suitable for the extraction of ammonia and other impurities from gas. The casing is built up of a number of superposed rings *a*, and the gas is passed through from inlet *b* to the outlet *c*. The central shaft *d* carries perforated trays *e* provided with scoops *f* for picking up the liquid which is discharged through the perforations into the ascending gas. The trays *g* for the liquid are provided with

overflow passages *h*, and the trays are spaced from the walls to provide a passage for the gas as shown by the arrows. Projecting baffles *i* are provided in such a position that the



liquid is sprayed both above and below them, and the gas is thus deflected so that it first travels against the spray and then with the spray.

- 254,476. VAT COLOURING MATTERS, PRODUCTION OF. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, June 2, 1925.

Naphthanthraquinone is treated with aluminium chloride at temperature of 160°–200° C. to obtain vat colouring matters which give violet to blue shades. Various diluents or solvents may be used, particularly organic compounds which are inert to aluminium chloride, e.g., phthalic anhydride. Other anhydrous metal chlorides such as sodium or ferric chloride may be added. Several examples are given.

- 254,539. RADIUM AND BARIUM SALTS, METHOD OF SEPARATING. I. Bashiloff, 3, Warwarka, Moskau, Russia. Application date, July 31, 1925.

A mixture of radium and barium salts is subjected to fractional crystallisation by the repeated addition of salts of the same ion as the solution, and which do not form soluble compounds with radium and barium salts. An example is given in which the mixed radium and barium chlorides are treated with calcium chloride solution, the crystals obtained having a higher radio-activity. These crystals are then dissolved again and again treated with calcium chloride, and so on. A final yield of radium salt of 94–95 per cent. can be obtained.

- 254,251. BARIUM CHLORIDE AND SULPHUR, PROCESS FOR PRODUCING FROM BARIUM SULPHIDE. A. Jahl, 11, Kirchplatz, Linz-on-Rhine, Germany. International Convention date, July 3, 1925.

The object is to avoid the evolution of sulphuretted hydrogen in the treatment of barium sulphide with hydrochloric acid to obtain barium chloride. If the mixture contains an excess

of sulphur dioxide, the sulphuretted hydrogen reacts with it, yielding a precipitate of sulphur, which can then be filtered off together with the insoluble portion of the sulphide. This may be used to obtain the sulphur dioxide. In an example, dilute hydrochloric acid is partly saturated with sulphur dioxide, and barium sulphide and hydrochloric acid in equivalent quantities are run into the mixture in such proportion that the sulphur dioxide is always in excess. The mixture is finally neutralised with barium sulphide or carbonate.

254,578. INSOLUBLE AZO DYESTUFFS, PROCESS FOR PRODUCING, IN SUBSTANCE OR ON THE FIBRE. W. Carpmal, London. From Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. Application date, October 29, 1925.

It is known that diazo compounds of asymmetrical *m*-xylidine and its substitution products produce on cotton fibres impregnated with 2:3-oxynaphthoic acid anilide red shades. It is now found that an improved fastness can be obtained if aniline in the coupling component is replaced by asymmetrical *m*-xylidine ($\text{CH}_3:\text{CH}_3:\text{NH}_2=1:3:4$) or a substitution product. In an example of the preparation of the dyestuff in substance, 2:3-oxynaphthoyl-1':3'-dimethyl-6'-nitro-4'-aminobenzene is dissolved in water containing caustic soda lye, sodium acetate is added, and the mixture neutralised with hydrochloric acid. A diazo solution is prepared from 1:3-dimethyl-6-chloro-4-aminobenzene, and is slowly added while cooling. The dye is filtered off and washed.

254,667. DIAMINO-DIARYL-UREA OR ITS DERIVATIVES, MANUFACTURE OF. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, May 21, 1926.

p,p'-diamino-diphenyl-urea or its derivatives are obtained by the reaction of urea with non-acetylated-*p*-phenylenediamine or its derivatives substituted in the nucleus. The reaction is carried out at 110°-130° C. in the presence of an inert diluent.

253,370. EXTRACTION OF COPPER FROM ORES, CONCENTRATES OR RESIDUES. H. S. Mackay, 4, Broad Street Place, London, E.C.2. Application date, July 2, 1925.

Specification 238,962 (see THE CHEMICAL AGE, Vol. XIII, p. 39, Metallurgical Section) describes the roasting of sulphide ores, concentrates, etc., under such conditions that the greatest proportion of copper is rendered soluble irrespective of the proportions of iron and aluminium also rendered soluble. The product is leached with sulphuric acid, and the solution treated to precipitate the iron and aluminium to the desired extent, and then electrolysed. In this invention the purification of the solution obtained by leaching is effected with calcium carbonate, and the copper sulphate solution is evaporated and crystallised.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—235,547 (T. Goldschmidt Akt.-Ges.), relating to chlorine compounds of the next higher homologues of ethylene, see Vol. XIII, p. 176; 240,164 (Aktieselskapet Krystal), relating to crystallisation in coarse granular form from solutions, see Vol. XIII, p. 528; 240,871 (G. Patart), relating to synthetic production of liquid ammonia, see Vol. XIII, p. 606; 242,234 (Chemische Fabrik auf Actien (vorm. E. Schering)), relating to silica gel, see Vol. XIV, p. 15; 243,736 (Distilleries des Deux Sèvres), relating to simple or mixed ethers of the fatty series, see Vol. XIV, p. 137; 245,421 (Metal Research Corporation), relating to reduction of alumina, see Vol. XIV, p. 23 (Metallurgical Section); 249,099 (Soc. of Chemical Industry in Basle), relating to vat dyestuffs, see Vol. XIV, p. 527; 250,598 (Soc. of Chemical Industry in Basle), relating to 2:3-amino-naphthoic acid, see Vol. XIV, p. 579.

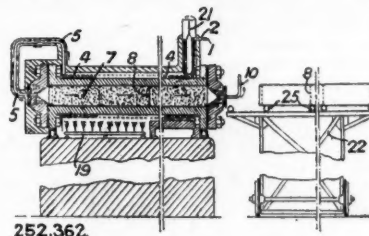
International Specifications not yet Accepted

252,361-2. CATALYTIC MATERIALS AND APPARATUS. G. Patart, 50, Rue Spontini, Paris. International Convention date, May 25, 1925.

252,361. Methyl alcohol and other oxygenated organic compounds are synthesised by the use of catalysts comprising basic combinations of zinc oxide with metallic oxides of an acid nature in the proportion of at least two equivalents to

one. Basic chromates, vanadates, tungstates, and manganates of zinc are suitable. Commercial products such as zinc yellow may be used, as the presence of alkaline sulphates is not injurious. Sulphur deposited in the catalyst is removed by heating it to redness under oxidising conditions.

252,362. The catalyst tubes are arranged horizontally and are gas-heated individually. The tube 7 is heated by gas burners 19, and the reaction gases enter through a coil 2 in



252,362.

the waste gas flue 21, and then through a coil 4 closely surrounding the catalyst tube, to the inlet 5. The catalyst may be charged into a gas-tight cylinder which is laid on a truck 22, brought into position, and pushed into the tube 7 over rollers 25. The cylinder may have a central rod to which the end plates of the tube 7 are screwed.

252,367. PHOSPHORUS AND CEMENTS. I. G. Farbenindustrie Akt.-Ges., 28, Mainzerstrasse, Frankfurt-on-Main, Germany. (Assignees of M. Platsch, 10, Meiningerstrasse, Schöneberg, Berlin.) International Convention date, May 23, 1925.

Crude phosphates, sand, and coke are fused in an electric furnace to obtain phosphorus, and bauxite is then added to the residue to obtain cement. The sand may also be replaced by bauxite.

252,370. PURIFYING OILS, ETC. Etablissements Rocca, Tassy et de Roux, 9, Rue de l'Arsenal, Marseilles, France. International Convention date, May 19, 1925.

A solution of fat or oil in a solvent such as benzine, carbon disulphide, or chlor-hydrocarbons, is treated with an alkaline base or salt, e.g., caustic soda or sodium carbonate, and the soap is then extracted with alcohol, diluted acetone, or other solvent not miscible with the volatile solvent. The solvents are finally distilled off.

252,388. ZINC OXIDE. Orkla Grube-Aktiebolag, Lökken Verk, Norway. International Convention date, May 22, 1925.

Zinc chloride solution is treated with less than the equivalent quantity of lime at 30°-40°C., and the oxychloride precipitate is then treated with the necessary quantity of lime at 70° C. to obtain the oxide. The precipitate is dried and sintered at 1,000°-1,200° C. to expel any sulphur and chlorine.

252,390. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. (Assignees of Farbwerke vorm. Meister, Lucius, and Brüning, Höchst-on-Main, Germany.) International Convention date, May 22, 1925.

A 1:3-dihalogen-4:6-dinitrobenzene or a substitution product is condensed with two molecules of a 4-amino-diphenylamine-sulphonic acid or a substitution product in the presence of a copper compound as catalyst, or an organic solvent such as alcohol. Thus, 1:3-dichlor-4:6-dinitrobenzene is condensed with 4'-nitro-4-amino-diphenylamine-2'-sulphonic acid, 4-amino-diphenylamine-2-sulphonic acid, or 4'-methyl-4-amino-diphenylamine-2-sulphonic acid in presence of alcohol.

252,394. SYNTHETIC RESINS. British Thomson-Houston Co., Ltd., Crown House, Aldwych, London. (Assignees of E. S. Dawson, 117, Ardsley Road, Schenectady, N.Y., U.S.A.) International Convention date, May 23, 1925.

Resins are obtained by the interaction of a polyhydric alcohol, one or more polybasic acids, a little sulphuric acid, and a fatty acid derived from a drying oil. Thus, glycerol, phthalic anhydride, and concentrated sulphuric acid are heated to 120° C., and eleostearic or linoleic acid subsequently added. A deep red resin is obtained.

252,399. ALUMINA AND ALUMINATES. Aktieselskapet Norsk Aluminium Co., 9, Lökkeveien, Oslo, Norway. International Convention date, May 23, 1925.

To obtain alumina, calcium aluminate slag is leached with

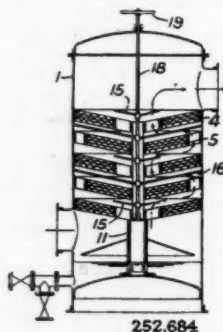
alkali carbonate containing caustic alkali, the total alkali being in excess of the dissolved alumina. Alumina is then precipitated by the Bayer process, the liquor being then treated with carbon dioxide until about 10 per cent. of caustic alkali remains, when the solution can be used again for leaching calcium aluminate.

252,679. ANTIMONY, ARSENIC, BISMUTH, LEAD, MERCURY, TIN, AND ZINC OXIDES. F. Krupp Grusonwerk, Akt.-Ges., Buckau, Magdeburg, Germany. International Convention date, May 26, 1925.

When ores of volatile metals are roasted with reducing substances to obtain the volatile metals as oxides, the reducing substances, e.g., anthracite or lignite, is blown into the furnace instead of being previously mixed with the ore.

252,684. SEPARATING LIQUIDS FROM GASES. L. Steinschneider, i. Franzengglacis, Brünn, Czecho-Slovakia. International Convention date, May 27, 1925.

Apparatus for removing tar from gases consists of a casing 1, having sloping elements 4, 5, composed of layers of grid



plates, each having inverted V-shaped ribs offset relatively to those of adjacent plates. Central and peripheral passages are provided, controlled by cover plates 15, 16, operated by a spindle 18 and hand wheel 19, so that a zigzag passage is provided for the gases when the elements 4, 5 are clogged with tar.

252,690. LITHIUM CARBONATE. Metallbank und Metallurgische Ges. Akt.-Ges., 45, Bockenheimer Anlage, Frankfurt-on-Main, Germany. International Convention date, May 29, 1925.

Solutions obtained by treating lepidolite or amblygonite are treated with potassium chloride to salt out the potassium sulphate and convert the lithium sulphate into chloride. Sodium or potassium carbonate is then added to precipitate lithium carbonate.

LATEST NOTIFICATIONS.

- 255,811. Process for the production of 2-hydrazino-5-nitropyridine. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler. July 22, 1925.
- 255,819. Adsorption apparatus. Silica Gel Corporation. July 27, 1925.
- 255,837. Polymerised vinyl-chloride modification and process of utilising the same. Dyk, L. A. Van. July 21, 1925.
- 255,839. Process for the production of organic arsenic compounds. Binz, Dr. A., and Râth, Dr. C. July 22, 1925.
- 255,846. Silver halide emulsion and a process for its manufacture. I.G. Farbenindustrie Akt.-Ges. July 25, 1925.
- 255,861. Process for the production of organic arsenical compounds. Binz, Dr. A., and Râth, Dr. C. July 22, 1925.
- 255,863. Manufacture and production of active colloids. I. G. Farbenindustrie Akt.-Ges. July 22, 1925.
- 255,864. Manufacture and production of active silica. I. G. Farbenindustrie Akt.-Ges. July 23, 1925.
- 255,865. Process for the prevention of boiler scale. Karplus, Dr. H. July 23, 1925.
- 255,871. Manufacture of active carbon. Soc. Pour L'Exploitation des Procédés E. Urbain. July 25, 1925.
- 255,876. Process and apparatus for neutralising ammonia crystals. Demann, W. July 24, 1925.
- 255,880. Process of preparing alcoholates. Loon, C. Van. July 21, 1925.
- 255,884. Manufacture of nickel catalyst. I. G. Farbenindustrie Akt.-Ges. July 22, 1925.
- 255,886. Production of amide acid sulphates from nitriles. Roessler and Hasslacher Chemical Co. July 22, 1925.
- 255,887. Production of esters from amide acid sulphates. Roessler and Hasslacher Chemical Co. July 22, 1925.

255,892. Process for the production of organic arseno compounds. Binz, Dr. A., and Râth, Dr. C. July 22, 1925.

255,896. Process for refining decamphorated oil of turpentine. I.G. Farbenindustrie Akt.-Ges. July 25, 1925.

255,900. Manufacture of azo-dyestuffs. I. G. Farbenindustrie Akt.-Ges. July 25, 1925.

255,904. Manufacture and production of active masses. I. G. Farbenindustrie Akt.-Ges. July 27, 1925.

255,905. Purification of hydrocarbons. I. G. Farbenindustrie Akt.-Ges. July 27, 1925.

Specifications Accepted with Date of Application

- 228,157. Resinous or cuprene-like condensation and polymerisation products of acetylene. Consortium für Elektrochemische Industrie Ges. January 23, 1924.
- 232,266. Halogenising perylene. H. Pereira. April 10, 1924.
- 235,157. Metallurgical processes. Guggenheim Bros. June 7, 1924.
- 238,241. Concentration of ores, etc. Bamag-Meguïn Akt.-Ges. August 6, 1924.
- 240,435. Alumina and sulphate of aluminium, Manufacture of. L. G. Patrouilleau and Soc. Anoh. Alumine et Derives. September 29, 1924.
- 242,958. Aluminium and aluminium alloys, Electrolytic process for producing. T. R. Haglund. November 15, 1924.
- 247,986. Complex antimony compounds, Manufacture of. W. Carpmæl. (I. G. Farbenindustrie Akt.-Ges.) February 19, 1926.
- 254,887. Stable pigment colours, Production of. W. Eberlein and Colloisil Colour Co., Ltd. January 16, 1925.
- 255,127. Organic compounds, Production of. J. Y. Johnson. (Badische Anilin und Soda Fabrik.) March 12, 1925.
- 255,139-255,145. Gas purification processes and apparatus. W. J. Mellersh-Jackson. (Koppers Co.) April 14, 1925.
- 255,159. Cracking and hydrogenation of hydrocarbon oils. G. W. Wallace. April 17, 1925.
- 255,167. Barium sulphide, Manufacture of. G. Richardson. April 20, 1925.
- 255,220. Diaryl-guanidines, Manufacture of. British Dyestuffs Corporation, Ltd., C. J. T. Cronshaw and W. J. S. Naunton. July 4, 1925.
- 255,232. Catalytic processes and apparatus for gaseous reactions. Synthetic Ammonia and Nitrates, Ltd., and F. H. Bramwell. July 17, 1925.
- 255,277. Condensation products and dyestuffs of the benzanthrone series. J. Y. Johnson. (Badische Anilin und Soda Fabrik.) October 7, 1925.
- 255,278. Catalytic synthesis of Ammonia. S. G. S. Dicker. (H. Harter.) October 7, 1925. Addition to 241,771.

Applications for Patents

- Bodrero, B. Preparation of sulphuro-phosphate, etc., fertilisers. 18,613. July 26.
- Carpmael, W., and I. G. Farbenindustrie Akt.-Ges. Manufacture of products of conversion of pericyannaphthalene sulphonic acids. 18,862. July 28.
- Dyk, L. A. van. Polymerised vinyl-chloride modification and process of utilising same. 18,578. July 26. (United States, November 2, 1925.)
- Graselli Chemical Co. and Marks, E. C. R. Treatment of lithopone. 18,755. July 27. (February 9.)
- I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of chromic chloride. 18,636. July 26.
- I. G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs. 18,622. July 26. (Germany, July 25, 1925.)
- I. G. Farbenindustrie Akt.-Ges. Manufacture of active masses. 18,633. July 26. (Germany, July 27, 1925.)
- I. G. Farbenindustrie Akt.-Ges. Purification of hydrocarbons. 18,634. July 26. (Germany, July 27, 1925.)
- I. G. Farbenindustrie Akt.-Ges. Manufacture of solutions of organic compounds. 18,635. July 26. (Germany, August 1, 1925.)
- I. G. Farbenindustrie Akt.-Ges. Manufacture of benziminazolon-arsenic acids. 18,766. July 27. (Germany, July 31, 1925.)
- I. G. Farbenindustrie Akt.-Ges. Manufacture of acid-proof cementing compositions. 19,032. July 30. (Germany, July 30, 1925.)
- Rohm and Haas Co. Resinous reaction products of urea and formaldehyde. 18,875. July 28. (United States, July 28, 1925.)
- Soc. of Chemical Industry in Basle. Manufacture of compounds of gall acids. 19,031. July 30. (Switzerland, September 2, 1925.)
- West Virginia Pulp and Paper Co. Processes for converting alkali sulphides into alkali sulphites. 18,972. July 29. (United States, October 29, 1925.)
- White, G. N. Production of coloured effects in building materials. 18,618. July 26.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.
 ACID BORIC, COMMERCIAL.—Crystal, £37 per ton, Powder, £39 per ton.
 ACID HYDROCHLORIC.—35. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.
 ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
 ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
 AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.
 BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.
 BLEACHING POWDER.—Spot, £9 10s. d/d; Contract, £8 10s. d/d, 4-ton lots.
 BORAX, COMMERCIAL.—Crystal, £23 per ton. Powder, £24 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
 CALCIUM CHLORIDE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, cart. paid.
 COPPER SULPHATE.—£25 to £25 10s. per ton.
 METHYLATED SPIRIT 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
 NICKEL SULPHATE.—£38 per ton d/d.
 NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
 POTASH CAUSTIC.—£30 to £33 per ton.
 POTASSIUM BICHROMATE.—4½d. per lb.
 POTASSIUM CHLORATE.—3½d. per lb., ex wharf, London, in cwt. kegs.
 SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, cart. paid.
 SALT CAKE.—£3 19s. to £4 per ton d/d. In bulk.
 SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
 SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.
 SODIUM ACETATE 97/98%.—£21 per ton.
 SODIUM BICARBONATE.—£10 10s. per ton, cart. paid.
 SODIUM BICHROMATE.—3½d. per lb.
 SODIUM BISULPHITE POWDER 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
 SODIUM CHLORATE.—3d. per lb.
 SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.
 SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.
 SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.
 SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Cart. paid.
 SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Cart. paid.
 SODIUM SULPHITE, FRA CRYSTALS.—£14 per ton f.o.r. London. 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—4½d. to 5d. per lb. Crude 60's, 1s. 5d. to 1s. 6d.
 ACID CRESYLIC 97/99.—2s. to 2s. 1d. per gall. Pale, 95%, 1s. 10d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d. per gall. Steady.
 ANTHRACENE.—A quality, 2½d. to 3d. per unit.
 ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.
 BENZOL.—Crude 65's, 1s. 4d. to 1s. 5d. per gall., ex works in tank wagons. Standard Motor, 2s. to 2s. 3d. per gall., ex works in tank wagons. Pure, 2s. 3d. to 2s. 9d. per gall., ex works in tank wagons.
 TOLUOL.—90%, 2s. to 2s. 3d. per gall. Pure, 2s. 3d. to 2s. 9d. per gall.
 XYLOL.—2s. 4d. to 3s. per gall. Pure, 3s. 6d. per gall.
 CREOSOTE.—Cresylic, 20/24%, 10d. per gall. Standard specification, middle oil, 6½d. to 7½d. per gall. Heavy, 7½d. to 8½d. per gall.
 NAPHTHA.—Crude, 10d. to 1s. 1d. per gall. according to quality. Solvent 90/160, 2s. to 2s. 3d. per gall. Solvent 90/190, 1s. 3½d. to 1s. 6d. per gall.
 NAPHTHALENE CRUDE.—Drained Creosote Salts, £3 10s. to £5 per ton. Whizzed or hot pressed, £5 10s. to £7 10s.
 NAPHTHALENE.—Crystals and Flaked, £11 10s. to £13 per ton, according to districts.
 PITCH.—Medium soft, 82s. 6d. to 90s. per ton.
 PYRIDINE.—90/140, 17s. to 20s. per gall. Heavy, 7s. to 10s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
 ACID ANTHRANILIC.—6s. 6d. per lb. 100%.
 ACID BENZOIC.—1s. 9d. per lb.
 ACID GAMMA.—8s. per lb.
 ACID H.—3s. 3d. per lb. 100% basis d/d.
 ACID NAPHTHIONIC.—2s. 2d. per lb. 100% basis d/d.
 ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.
 ACID SULPHANILIC.—9d. per lb. 100% basis d/d.
 ANILINE OIL.—9½d. per lb. naked at works.
 ANILINE SALTS.—9½d. to 7½d. per lb. naked at works.
 BENZALDEHYDE.—2s. 1d. per lb.
 BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.
 o-CRESOL 29/31° C.—3d. to 3½d. per lb.
 m-CRESOL 98/100%.—2s. 1d. to 2s. 3d. per lb.
 p-CRESOL 32/34° C.—2s. 1d. to 2s. 3d. per lb.
 DICHLORANILINE.—2s. 3d. per lb.
 DIMETHYLANILINE.—1s. 11d. to 2s. per lb. d/d. Drums extra.
 DINITROBENZENE.—9d. per lb. naked at works.
 DINITROCHLOROBENZENE.—£84 per ton d/d.
 DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C., 9d. per lb. naked at works.
 DIPHENYLANILINE.—2s. 10d. per lb. d/d.
 o-NAPHTHOL.—2s. per lb. d/d.
 B-NAPHTHOL.—11d. to 1s. per lb. d/d.
 o-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.
 B-NAPHTHYLAMINE.—3s. 2d. per lb. d/d.
 o-NITRANILINE.—3s. 9d. per lb.
 m-NITRANILINE.—3s. 3d. per lb. d/d.
 p-NITRANILINE.—1s. 9d. per lb. d/d.
 NITROBENZENE.—5d. per lb. naked at works.
 NITRONAPHTHALENE.—10d. per lb. d/d.
 R. SALT.—2s. 4d. per lb. 100% basis d/d.
 SODIUM NAPHTHIONATE.—1s. 9d. per lb. 100% basis d/d.
 o-TOLUIDINE.—8d. per lb. naked at works.
 p-TOLUIDINE.—2s. 2d. per lb. naked at works.
 m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8. Grey, £17 10s. per ton. Liqueur, 9d. per gall. 32° Tw.
 CHARCOAL.—£7 to £9 per ton, according to grade and locality.
 IRON LIQUOR.—1s. 6d. per gall. 32° Tw. 1s. 2d. per gall., 24° Tw.
 RED LIQUOR.—9½d. to 1s. per gall.
 WOOD CREOSOTE.—2s. 9d. per gall. Unrefined.
 WOOD NAPHTHA, MISCIBLE.—3s. 6d. per gall. 60% O.P. Solvent, 3s. 6d. per gall. 40% O.P.
 WOOD TAR.—£3 to £5 per ton, according to grade.
 BROWN SUGAR OF LEAD.—£39 to £40 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5d. per lb., according to quality. Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.
 ARSENIC SULPHIDE, YELLOW.—2s. per lb.
 BARYTES.—£3 10s. to £6 15s. per ton, according to quality.
 CADMIUM SULPHIDE.—2s. 9d. per lb.
 CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.
 CARBON BLACK.—5½d. per lb., ex wharf.
 CARBON TETRACHLORIDE.—£46 to £55 per ton, according to quantity, drums extra.
 CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
 DIPHENYLGUANIDINE.—3s. 9d. per lb.
 INDIANRUBBER SUBSTITUTES, WHITE AND DARK.—5½d. to 6½d. per lb.
 LAMP BLACK.—£35 per ton, barrels free.
 LEAD HYPOSULPHITE.—9d. per lb.
 LITHOPONE, 30%.—£22 10s. per ton.
 MINERAL RUBBER "RUBFRON".—£13 12s. 6d. per ton f.o.r. London.
 SULPHUR.—£9 to £11 per ton, according to quality.
 SULPHUR CHLORIDE.—4d. per lb., carboys extra.
 SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.
 THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.
 THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.
 VERMILION, PALE OR DEEP.—5s. 3d. per lb.
 ZINC SULPHIDE.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, 80% B.P.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 6d. per lb. Brisk demand.

ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity.

ACID, BORIC B.P.—Crystal, £43 per ton; Powder, £47 per ton. Carriage paid any station in Great Britain, in ton lots.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 4d. to 1s. 4½d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, PYROGALLIC, CRYSTALS.—6s. 7d. per lb. Resublimed, 7s. 3d.

ACID, SALICYLIC.—1s. 4d. to 1s. 5½d. per lb. Technical.—10½d. to 11d. per lb.

ACID, TANNIC B.P.—2s. 10d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%. Market firm.

AMIDOL.—8s. 6d. per lb., d/d.

ACETANILIDE.—1s. 7d. to 1s. 8d. per lb. for quantities.

AMIDOPYRIN.—12s. 6d. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.

AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.

ATROPINE SULPHATE.—11s. per oz. for English make.

BARBITONE.—9s. per lb.

BENZONAPHTHOL.—3s. 3d. per lb. spot.

BISMUTH CARBONATE.—12s. 6d. to 14s. 3d. per lb.

BISMUTH CITRATE.—9s. 6d. to 11s. 3d. per lb.

BISMUTH SALICYLATE.—10s. 3d. to 12s. per lb.

BISMUTH SUBNITRATE.—10s. 9d. to 12s. 6d. per lb. according to quantity.

BORAX B.P.—Crystal, £27; Powder, £28 per ton. Carriage paid any station in Great Britain, in ton lots.

BROMIDES.—Potassium, 1s. 9d. to 1s. 11d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; ammonium, 2s. 2d. to 2s. 5d. per lb., all spot.

CALCIUM LACTATE.—1s. 4d. to 1s. 6d.

CHLORAL HYDRATE.—3s. 3d. to 3s. 6d. per lb., duty paid.

CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

FORMALDEHYDE.—£40 per ton, in barrels ex wharf.

GUAIACOL CARBONATE.—7s. 6d. per lb.

HEXAMINE.—2s. 4d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 8d. per gallon f.o.r. makers' works, naked.

HYDROQUINONE.—4s. 3d. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.

IRON AMMONIUM CITRATE B.P.—2s. to 2s. 3d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 1d. to 2s. 4d. per lb.

IRON PEROCHLORIDE.—20s. to 22s., according to quantity.

MAGNESIUM CARBONATE.—Light Commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light Commercial, £67 10s. per ton, less 2½% price reduced; Heavy Commercial, £22 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.

MENTHOL.—A.B.R. recrystallised B.P., 19s. 9d. net per lb., Synthetic, 10s. 6d. to 12s. 6d. per lb., according to quality.

MERCURIALS.—Red oxide, 5s. 11d. to 6s. 1d. per lb.; Corrosive sublimate, 4s. 3d. to 4s. 5d. per lb.; white precipitate, 4s. 9d. to 4s. 11d. per lb.; Calomel, 4s. 6d. to 4s. 8d. per lb.

METHYL SALICYLATE.—1s. 7d. per lb.

METHYL SULPHONAL.—16s. 6d. per lb.

METOL.—10s. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb. (1s. 2d. in carboys.)

PHENACETIN.—4s. per lb.

PHENAZONE.—6s. per lb.

PHENOLPHTHALEIN.—4s. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots.

POTASSIUM CITRATE.—1s. 11d. to 2s. 1d. per lb.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb. in cwt. lots. Quiet.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 6½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 0½d. per oz., in 100 oz. tins.

RESORCIN.—4s. to 5s. per lb., spot.

SACCHARIN.—55s. per lb.

SALOL.—3s. per lb.

SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.

SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923. 1s. 11d. to 2s. 2d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb. carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. to 80s. per cwt., according to quantity.

SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s per ton, according to quantity; 1-cwt. kegs included.

SULPHONAL.—11s. per lb.

TARTAR EMETIC, B.P.—Crystal or Powder, 1s. 10d. to 1s. 11d. per lb.

THYMOL.—12s. to 13s. 9d. per lb.

Perfumery Chemicals

ACETOPHENONE.—10s. per lb.

AUBEPINE (EX ANETHOL).—10s. per lb.

AMYL ACETATE.—3s. per lb.

AMYL BUTYRATE.—5s. 6d. per lb.

AMYL SALICYLATE.—3s. 3d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 9d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. 3d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. 3d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL BENZOATE.—2s. 9d. per lb.

CINNAMIC ALDEHYDE NATURAL.—17s. 9d. per lb.

COUMARIN.—11s. 9d. per lb.

CITRONELLOL.—15s. per lb.

CITRAL.—10s. per lb.

ETHYL CINNAMATE.—10s. per lb.

ETHYL PHTHALATE.—3s. per lb.

EUGENOL.—10s. per lb.

GERANIOL (PALMAROSA).—20s. per lb.

GERANIOL.—6s. 3d. to 11s. 6d. per lb.

HELIOTROPINE.—5s. per lb.

ISO EUGENOL.—14s. per lb.

LINALOL.—14s. to 17s. 6d. per lb.

LINALYL ACETATE.—17s. to 20s. per lb.

METHYL ANTHRANILATE.—9s. 3d. per lb.

METHYL BENZOATE.—5s. per lb.

MUSK KETONE.—34s. 6d. per lb.

MUSK XYLOL.—8s. per lb.

NEROLIN.—3s. 9d. per lb.

PHENYL ETHYL ACETATE.—12s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—27s. 6d. per lb.

SAFROL.—1s. 6d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN.—21s. 9d. per lb.

Essential Oils

ALMOND OIL.—11s. 6d. per lb.

ANISE OIL.—3s. per lb.

BERGAMOT OIL.—27s. per lb.

BOURBON GERANIUM OIL.—12s. per lb.

CAMPHOR OIL.—67s. 6d. per cwt

CANANGA OIL, JAVA.—20s. per lb.

CINNAMON OIL, LEAF.—6d. per oz.

CASSIA OIL, 80/85%.—8s. 9d. per lb.

CITRONELLA OIL.—Java, 85/90%, 2s. 8d. Ceylon, 2s. per lb.

CLOVE OIL.—7s. per lb.

EUCALYPTUS OIL, 70/75%.—2s. per lb.

LAVENDER OIL.—French 38/40%, Esters, 15s. 6d. per lb.

LEMON OIL.—7s. 9d. per lb.

LEMONGRASS OIL.—4s. 6d. per lb.

ORANGE OIL, SWEET.—10s. 9d. per lb.

OTTO OF ROSE OIL.—Bulgarian, 65s. per oz. Anatolian, 30s. per oz.

PALMA ROSA OIL.—9s. 9d. per lb.

PEPPERMINT OIL.—Wayne County, 67s. 6d. per lb. Japanese, 11s. 6d. per lb.

PETITGRAIN OIL.—9s. per lb.

SANDAL WOOD OIL.—Mysore, 26s. per lb. Australian, 17s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R.W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, August 5, 1926.

THERE is little to report in the market this week, the orders being limited to prompt requirements, although inquiries are increasing, which will most probably lead to a broadening in business as soon as the numerous works reopen after the holidays. Export demand still continues quiet.

General Chemicals

ACETONE.—The market is purely nominal, and no further change in the position is reported.

ACID ACETIC.—A steady demand has been received: also on export account trade is increasing.

ACID FORMIC is without change, and the comparatively light stocks are firmly held.

ACID LACTIC is in good request, with price unchanged at £43 for 50% by weight.

ACID OXALIC continues only in small request at 3½d. to 3¾d. per lb.

ACID TARTARIC is only in moderate request at 11¾d. per lb.

ALUMINA SULPHATE.—Competition continues keen, with a fair amount of business offering; prices are unchanged from £5 10s. to £5 15s. per ton for the 17/18% grade.

AMMONIUM CHLORIDE is dull, with the market slightly easier.

ARSENIC.—A little more inquiry has been received, although the actual business concluded continues of small volume. Prices so far are unchanged at about £15 to £17 per ton, delivered London.

BARIUM CHLORIDE.—A fair demand has been received, and the price shows no change at £10 per ton.

EPSOM SALTS is in good request, without any change in price.

FORMALDEHYDE.—A fair business has been transacted, and the price is kept at £40 to £42 per ton.

IRON SULPHATE is still in short supply, with the price firm.

LEAD ACETATE is extremely firm, with white at £46 10s. and brown at £43. A good demand has been received.

METHYL ALCOHOL.—No change is reported.

METHYL ACETONE.—A fair amount of business has been transacted at about £55 per ton.

POTASSIUM CHLORATE is in good request, especially on export account.

POTASSIUM PERMANGANATE.—The demand lags and price for the B.P. quality is easy at about 7d.

POTASSIUM PRUSSATE maintains its firm position and is quoted at 7d. per lb.

SODIUM ACETATE on spot continues scarce and fetches about £21 per ton.

SODIUM BICHROMATE.—Quite a good business has been booked here, with no appreciable change in the price.

SODIUM NITRATE is steady and in fair demand at £20 10s.

SODIUM PHOSPHATE is firmer, with the demand increasing at about £13 10s.

SODIUM PRUSSATE.—Prices are firmly held at 3½d., with a fair business passing.

SODIUM SULPHIDE is unchanged, with continental material competing keenly.

ZINC SULPHATE is in fair request.

Coal Tar Products

Owing to the continuance of the coal strike, prices quoted are in all cases more or less nominal.

90's BENZOL.—Quotations are only obtainable for continental material, and the price asked is 2s. 2d. per gallon f.o.b. continental port, naked.

PURE BENZOL is unobtainable.

CREOSOTE OIL is very firm, the price on rails in the provinces being 7d. per gallon, while the price in London for spot parcels is steady at 7½d. per gallon at makers' works.

CRESYLIC ACID is somewhat scarce, the pale quality 97/99% being worth about 2s. 2d. per gallon on rails, while the dark quality 95/97% is worth about 2s. per gallon.

SOLVENT NAPHTHA.—There is very little available, and 1s. 10d. per gallon is being paid on rails at makers' works.

HEAVY NAPHTHA is worth 1s. 4d. to 1s. 5d. per gallon on rails, for the few parcels offered.

NAPHTHALENES are unchanged, the 76/78 quality being worth about £6 15s. per ton, and the 74/76 quality about £5 15s. per ton, at makers' works.

Latest Oil Prices

LONDON.—LINSEED OIL steady at occasionally 2s. 6d. decline, spot, £36 5s., ex mill; August, £35 2s. 6d.; September-December, £35 7s. 6d.; January-April, £35 17s. 6d. RAPE OIL quiet. Crude extracted, £49; technical refined, £51. COTTON OIL steady. Refined, common edible, £46; Egyptian crude, £43; deodorised, £44. TURPENTINE steady and about 3d. per cwt. higher. American spot, 63s.; September-December, 64s. 6d.; January-April, 66s. 6d.

HULL.—LINSEED OIL.—Naked, spot to September-December, £35 15s.; January-April, £35 17s. 6d. COTTON OIL.—Naked, Bombay crude, £37; Egyptian crude, £40 5s.; edible refined, £45; technical, £41. PALM KERNEL OIL.—Crushed naked, 5½%, £42. GROUNDNUT OIL.—Crushed, extracted, £47; deodorised, £51. SOYA OIL.—Extracted and crushed, £38; deodorised, £41 10s. RAPE OIL.—Crude/extracted, £48, refined, £50 per ton net cash terms ex mill. CASTOR OIL and COD OIL unaltered.

Nitrogen Products

Export.—The market for sulphate of ammonia remains very quiet. Prices remain unchanged at about £10 15s. per ton f.o.b. U.K. port in single bags. The extra charge for double bags remains at 12s. 6d. per ton. British producers are unable to sell except from hand to mouth. There have been no reports of large sales recently.

Home.—British producers have announced home prices as follows:—1926—September, £11 7s.; October, £11 9s.; November, £11 11s.; December, £11 13s. 1927—January, £11 15s.; February, £11 18s.; March, £12 1s.; April-May, £12 1s., for neutral quality 20.6% nitrogen, delivered in 4 ton lots to consumer's nearest station. The British production is fully sold for August delivery and producers do not quote for that position.

Nitrate of Soda.—The nitrate position remains unchanged. The amount of business transacted is small. Producers are still offering at scale prices of 18s. 5d. per metric quintal. It appears unlikely that there will be any larger production of nitrate stocks until the demand from consumers sets in towards the end of the year.

Calcium Cyanamide

No announcement has yet been made concerning the new season's prices of this fertiliser, for delivery in Great Britain. The present price of calcium cyanamide, delivered in 4 ton lots to any railway station, is £10 6s. per ton.

The Future of Tars

LOOKING ahead (Sir Arthur Duckham states, in an article in the *Manchester Guardian Commercial*), it may yet happen that tars, produced either with existing types of plant or in so-called low-temperature processes of carbonisation, may become a liquid fuel in the event of either a very large development in the carbonisation industries or, alternatively, a shortage of oil supply. The gas industry was for many years the main supplier of sulphate of ammonia, and derived from this product a valuable credit. With the installation of synthetic ammonia plants in this country and abroad, the position has changed, and now only a portion of the world's requirements comes from the gas industry. During 1924 125,000 tons of sulphate of ammonia were made on English gasworks. This changed position has stimulated, however, the development of processes for producing cheaper ammonium sulphate, and may lead to new advances in the production of fertilisers.

The gas industry, despite keen competition in all directions, is making rapid progress, and has technically and economically consolidated its position during the past eight years. There is every reason to believe that this development will continue and that the advantages will pass on to the consumer in the form of cheaper gas. From the point of view of the industrial user there is one direction in which the British gas industry appears to lag behind the gas industry of America, and behind the electrical industry, and that is the diffidence in adopting special rates for large users.

Nitrate Prospects

THE monthly report on nitrate of soda for July, issued by Henry Bath and Sons, states that deliveries from European ports during July amounted to about 47,000 tons, as against 39,000 tons in July, 1925. Labour troubles have prevented the movement of nitrate from Dunkirk for the past two months, and the port of Rouen is now similarly affected. Exceedingly quiet conditions have prevailed in continental markets. Spot delivery in Antwerp is obtainable at £10 5s. per 1,000 kilos, or nearly £1 per ton below the price which ruled a year ago, but the inquiry is only moderate and for forward delivery practically non-existent. No c.i.f. transactions are reported.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, August 3, 1926.

THE continuance of the Coal Strike still holds up business, but prices remain steady with practically no change since our last report.

Industrial Chemicals

- ACID ACETIC, 98/100%.—£55 to £67 per ton, according to quantity and packing, c.i.f. U.K. port; 80% pure, £39 to £41 per ton; 80% technical, £38 to £39 per ton.
- ACID BORIC.—Crystal, granulated or small flakes, £37 per ton; powdered, £39 per ton, packed in bags, carriage paid U.K. stations.
- ACID CARBOLIC, ICE CRYSTALS.—In moderate demand and quoted price unchanged at 4½d. per lb., delivered or f.o.b. U.K. port.
- ACID CITRIC, B.P. CRYSTALS.—Usual steady demand and price unchanged at about 1s. 3½d. per lb., less 5% ex store. Offered for prompt shipment at 1s. 3½d. per lb., less 5%, ex wharf.
- ACID FORMIC, 85%.—Spot material quoted £52 per ton, ex store. Rather cheaper offers from the continent now quoted £49 10s. per ton, c.i.f. U.K. ports.
- ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.
- ACID NITRIC, 80%.—Usual steady demand and price unchanged at £23 5s. per ton, ex station, full truck loads.
- ACID OXALIC, 98-100%.—Remains unchanged at about 3½d. per lb., ex store. Offered for early delivery from the continent at 3½d. per lb., ex wharf.
- ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.
- ACID TARTARIC, B.P. CRYSTALS.—In good demand and price for spot material advanced to about 11½d. per lb., less 5% ex store. Quoted for early delivery at 11½d. per lb., less 5%, ex wharf.
- ALUMINA SULPHATE, 17-18%, IRON FREE.—On offer from the continent at about £5 8s. 6d. per ton, c.i.f. U.K. ports. Spot material quoted £6 5s. per ton, ex store.
- ALUM LUMP POTASH.—Spot material unchanged at about £9 5s. per ton, ex store. Quoted £8 per ton, c.i.f. U.K. ports, prompt shipment. Crystal powder on offer at about £7 15s. per ton, c.i.f. U.K. port. Spot material available at £8 7s. 6d. per ton, ex store.
- AMMONIA ANHYDROUS.—Imported material selling at about 11½d. to 11½d. per lb., ex wharf, containers extra and returnable.
- AMMONIA CARBONATE.—Lump £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered or f.o.b. U.K. ports.
- AMMONIA, LIQUID, 88%.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.
- AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture, quoted £23 10s. to £25 10s. per ton, ex station. Continental on offer at about £21 10s. per ton, c.i.f. U.K. ports. Fine white crystals of continental manufacture quoted £18 2s. 6d. per ton, c.i.f. U.K. port.
- ARSENIC, WHITE POWDERED.—Unchanged at about £15 15s. per ton, ex wharf, early delivery. Spot material on offer at £16 10s. per ton, ex store.
- BARIUM CARBONATE, 98-100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.
- BARIUM CHLORIDE.—Quoted £9 2s. 6d. per ton, c.i.f. U.K. ports. Spot material now available at about £10 5s. per ton, ex store.
- BLEACHING POWDER.—English material, unchanged at £9 10s. per ton, ex station; contracts 20s. per ton less. Continental now quoted £7 15s. per ton, c.i.f. U.K. ports.
- BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.
- BORAX.—Granulated, £22 10s. per ton; crystals, £23 per ton; powdered, £24 per ton; carriage paid U.K. stations.
- CALCIUM CHLORIDE.—English manufacturer's price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental quoted £3 15s. per ton, c.i.f. U.K. port.
- COPPERAS, GREEN.—Quoted £3 10s. per ton, f.o.b. works. Moderate inquiry for export, and price about £4 2s. 6d. per ton, f.o.b. U.K. port.
- COPPER, SULPHATE, 99-100%.—Continental material on offer at about £22 10s. per ton, ex wharf. English material for export quoted £23 5s. per ton, f.o.b. U.K. ports.
- FORMALDEHYDE, 50%.—Rather higher quotations. Now quoted £39 per ton, c.i.f. U.K. ports. Spot material still available at £40 per ton, ex store.
- GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £3 per ton, c.i.f. U.K. ports.
- LEAD, RED.—Imported material quoted £38 per ton, ex store.
- LEAD, WHITE.—On offer at £39 per ton, ex store.
- LEAD, ACETATE.—White crystals quoted £45 per ton, c.i.f. U.K. ports, prompt shipment. Brown about £40 10s. per ton, c.i.f. U.K. ports.
- MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.
- POTASH, CAUSTIC, 88-92%.—Syndicate prices vary from £25 10s. to £28 15s. per ton, c.i.f. U.K. ports, according to quantity and destination. Spot material available at about £29 per ton.
- POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.
- POTASSIUM CARBONATE, 96-98%.—Quoted £25 5s. per ton, ex wharf, early delivery. Spot material on offer at £26 10s. per ton, ex store; 90-94% quality quoted £22 5s. per ton, c.i.f. U.K. ports.
- POTASSIUM CHLORATE, 98-100%.—Powdered on offer at £26 15s. per ton, c.i.f. U.K. ports. Crystals, £28 per ton, c.i.f. U.K. ports.
- POTASSIUM NITRATE (SALTPETRE).—Unchanged at about £22 5s. per ton, c.i.f. U.K. ports, spot material available at £24 10s. per ton, ex store.
- POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 7½d. per lb., ex store, spot delivery. To come forward, 7d. per lb., ex wharf.
- POTASSIUM PRUSSIAN, YELLOW.—Now quoted 7d. per lb., ex wharf, spot delivery. Also to come forward.
- SODA CAUSTIC, 76-77%.—£17 10s. per ton; 70-72%, £16 2s. 6d. per ton. Broken, 60%, £16 12s. 6d. per ton. Powdered, 98-99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.
- SODIUM ACETATE.—English material quoted £22 per ton, ex station. Continental on offer at about £20 10s. per ton, ex store, or to come forward, £19 15s. per ton, c.i.f. U.K. ports.
- SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.
- SODIUM BICHROMATE.—English price unchanged at 3½d. per lb., delivered.
- SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more (Alkali 58%), £8 12s. 3d. per ton, ex quay or station.
- SODIUM HYPOSULPHITE OF SODA.—Large crystals of English manufacture quoted £9 per ton, ex station, minimum 4 ton lots. Pea crystals, £14 10s. per ton, ex station. Continental commercial on offer at about £7 15s. per ton, c.i.f. U.K. ports.
- SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98% refined quality, 7s. 6d. per ton extra.
- SODIUM NITRITE, 100%.—Quoted £24 per ton, ex store. Offered from the continent at about £22 5s. per ton, c.i.f. U.K. ports.
- SODIUM PRUSSIAN, YELLOW.—Offered for early delivery at 4d. per lb., ex wharf. Spot material quoted 4½d. per lb., ex store.
- SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, ex works. Good inquiry for export and higher prices obtainable.
- SODIUM SULPHIDE, 60/62%.—Solid, £13 5s. per ton; broken, £14 5s. per ton; flake, £15 5s. per ton; crystals, 31/34%, £8 12s. 6d. per ton. All delivered buyers works U.K., minimum 5 ton lots with slight reduction for contracts. 60/62%, solid quality offered from the continent at about £9 15s. per ton, c.i.f. U.K. ports; broken, 15s. per ton more; crystals, 30/32%, £7 per ton, c.i.f. U.K. ports.
- SULPHUR.—Flowers, £11 10s. per ton; Roll, £10 5s. per ton; Rock, £10 5s. per ton; Floristella, £9 15s. per ton; Ground American, £9 per ton, ex store, spot delivery. Prices nominal.
- ZINC CHLORIDE.—British material, 96/98%, quoted £23 15s. per ton, f.o.b. U.K. ports; 98/100%, solid, on offer from the continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered, 20s. per ton extra.
- ZINC SULPHATE.—Continental make on offer at about £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

AN EXPLOSION, due to the bursting of drums of carbide in a burning railway van upon which water was being played, occurred recently at Northallerton.

MATCHES TIPPED WITH SULPHUR AT BOTH ENDS, and believed to be the first type of match invented were found by some workmen engaged upon the restoration of an old house at Wivenhoe.

NAPHTHA IN A CARGO OF GERMAN COAL was responsible for injury to the eyes of a number of dock workers who were discharging a ship laden with the coal at Belfast. Several men were admitted to hospital, and it was afterwards stated that the injuries were caused by naphtha fumes, although it is not known how the naphtha managed to get into the coal.

Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, August 5, 1926.

THE demand for chemical products here remains comparatively slow and the volume of business has not been improved by the pronounced holiday atmosphere which this week seems to pervade all markets. Home trade users are content to take little more than is sufficient to satisfy immediate requirements, forward commitments for the time being remaining at a discount. Demand for shipment on this market continues poor from pretty well all directions, and orders are relatively small in bulk. There have been a few minor alterations in prices during the week, but on the whole the market keeps steady.

Heavy Chemicals

Prussiate of soda is still being quoted here at 3½d. per lb., but inquiry for this remains quiet and no improvement can be reported. Acetate of soda is well held at £21 to £21 10s. per ton, although business is on a small scale. Bleaching powder meets with a quiet demand at steady prices, about £8 10s. per ton still being asked. Caustic soda is unchanged in position or value and from £15 2s. 6d. to £17 10s. per ton, according to quality, is still the current range of values. Sulphide of sodium is a dull section and values are easy, although perhaps without actual change compared with last week, concentrated material being offered at £10 10s. per ton and commercial at £8 15s. Glauber salts move off very slowly at about £3 15s. per ton. Phosphate of soda is still quoted at about £12 10s. per ton, but there is no improvement in the quantity being disposed of. For alkali quotations continue round £6 15s. per ton, and demand is fair. In the case of nitrite of soda prices are maintained at about £20 per ton. Hyposulphite of soda is in moderate request and quotations fairly steady at £15 to £15 5s. per ton for photographic material and £9 15s. for commercial quality. Chlorate of soda is quiet and on the easy side at about 3½d. per lb. Salteake continues very dull at £3 per ton. For bichromate of soda prices show little change at about 3½d. per lb.

In the potash group permanganate is in quiet demand and values may be a little easier this week, with B.P. quality quoted at 6½d. to 7d. per lb. and commercial at about 5d. Carbonate of potash is in limited request, although unchanged at about £26 per ton for 90 per cent. strength. Caustic potash is still being offered at £27 per ton. Sales of yellow prussiate of potash continue moderate with values ranging round 6½d. per lb. Chlorate of potash is quiet but fairly steady at about 3½d. per lb.

The export demand for sulphate of copper remains relatively slow, although prices are rather steadier again at about £23 5s. per ton. Arsenic is still a quiet section at £13 10s. per ton, on rails, for white powdered, Cornish makes. Nitrate of lead meets with a limited demand at steady prices, about £41 10s. per ton being quoted. Acetate of lead is still very firm at £46 per ton for white material and about £42 for brown. Although quiet acetate of lime is also well held at £16 10s. to £17 per ton for grey and £8 for brown.

Acids and Tar Products

Tartaric and citric acids retain their recent steadiness, and 11½d. and 1s. 3½d. per lb. respectively are still about current values; in both cases, however, demand is only moderate. Oxalic acid remains dull and weak, to-day's price being no better than 3½d. per lb. Acetic acid is rather quiet, but quotations are steady, 80 per cent. commercial material still being quoted at £37 to £38 per ton and glacial at £67.

The coal tar products are becoming scarcer and dearer, and in some instances prices are purely nominal. Creosote oil is quoted now at 7d. to 7½d. per gallon. Pitch, for forward shipment, ranges from 90s. to 95s. per ton, f.o.b. Solvent naphtha is very firm at from 1s. 10d. to 2s. per gallon, while aniline oil and salt are also higher at 9d. to 10d. per lb.

British Pharmaceutical Society

ADDRESSING a large gathering at the annual conference of the British Pharmaceutical Society at Leicester on Tuesday, the President (Mr. D. L. Howard) strenuously rebutted the statement so frequently made that there was no British chemical industry worthy of the name before the great war. As a matter of fact, he said, during the whole of the nineteenth

century we produced all the fine chemicals required for pharmaceutical purposes, but said little about it. When the production of fine chemicals by synthesis was undertaken on the Continent on a large scale the new development was fostered by huge publicity propaganda that left the general impression on the minds of the British public that we depended entirely on the Continent for medicinal products. He traced the discovery of Epsom salts back to 1620, the production of magnesium salts at Shooters Hill, Kent, to 1700, and also from sea water at Portsmouth, Lymington, and the South Coast places, until cheaper patent processes superseded them early in the nineteenth century. Alum Bay in the Isle of Wight, he said, owed its name to the use made of part of its natural soil. The development of the manufacture of alum proceeded in many other parts of the country till, in 1869, the annual production in the United Kingdom was 8,000 tons. In the early days of the last century, too, 20,000 tons of soda were produced from seaweed (kelp) in Scotland, and at that date realised about £20 per ton. Iodine had been extracted from kelp from 1841 in Glasgow, and in the Hebrides later, but was not now able to be profitably worked, owing to the cheapness of substitutes. Tartaric acid, citric acid, and similar products had been manufactured here for over a hundred years. Chloroform and ether were British productions. The British alkaline industry was, and had been for more than a century, one of very considerable importance, and the production of insulin was an achievement of which they might be proud. The facts relating to the history of British chemical achievement in the past had, he continued, been difficult to trace owing to our national failing—we did not advertise.

Affairs of J. Hunter Smith and Co.

A MEETING of the creditors of J. Hunter Smith and Co., Ltd., wholesale and retail druggists, 8, Glassford Street, Glasgow, was held on Monday. The chair was occupied by Mr. Maurice Crichton, the liquidator appointed in the voluntary liquidation of the company. A statement of affairs was submitted which disclosed liabilities of £7,247 5s. 8d., of which £3,642 3s. 7d. was due in respect of cash claims, while there were trade creditors amounting to £3,604 2s. 1d. A deficiency was shown of £4,100 1s. 3d. The estate thus indicated an apparent dividend of 8s. 8d. in the £, subject to contingencies and expenses of realisation.

The Chairman reported that at a meeting of the principal trade creditors the opinion was expressed that the business should be continued. An offer of a composition of 5s. in the £ down and another in September was made, but it had not been possible to carry that arrangement through. It was decided to confirm the voluntary liquidation of the company, with Mr. M. Crichton as liquidator. A committee was nominated, consisting of Mr. Robert Graham (T. and H. Smith, Ltd.), Mr. Robert Dykes, Mr. James Stirrat, and Sir Archibald Craig. It was also resolved that the business should be continued under the supervision of the liquidator and committee, and that a further meeting of creditors should be convened to receive a report.

The Liège Conference

IT is expected that there will be a satisfactory attendance at the autumn meeting of the Institute of Metals, which is to be opened at Liège on Wednesday, September 1, and will continue over Saturday, September 4. On the opening day there will be a reception by the Burgomaster of Liège, and in the evening Dr. W. Rosenhain will deliver the fifth Autumn Lecture on "Ancient Industries and Modern Metallurgy," in the Salle Académique of the University of Liège.

The general meeting of members will follow on the Thursday, in the Hall of the Association des Ingénieurs, 16, Quai des Etats-Unis, Liège, when there will be presented a list of the honorary officers and ordinary members of council retiring at the annual general meeting and eligible for re-election. A selection of papers will be given in abstract and discussed. In the afternoon there will be visits to several works, and in the evening a reception by the Association des Ingénieurs sortis de l'Ecole de Liège. The general meeting of members will be continued on Friday and further papers will be presented and discussed. The afternoon will be spent in visits to works. On Saturday there is an all-day excursion by motor to Spa.

Company News

AMALGAMATED ZINC (DE BAVAY'S).—A dividend of 1s. per share, less tax, is payable on August 26.

UNITED ALKALI CO., LTD.—The declaration of an interim payment on the ordinary shares has been postponed until the meeting of the board in September next.

ENGLISH VELVET AND CORD DYERS' ASSOCIATION.—An interim dividend of 2 per cent. is announced on the ordinary shares for the half-year ended June 30, less tax. A similar payment was made a year ago.

A. BOAKE, ROBERTS AND CO.—For the year ended March 31, 1926, the report states that the accounts show a credit balance of £19,079 to be carried forward, after payment of the dividends on the preference shares and a dividend of 6 per cent. on the ordinary shares, providing £5,348 for bonus to employees and commissions, £7,967 for taxes, and transferring £200 to the staff provident fund.

BENN BROTHERS, LTD.—The net profit for the year ended June 30 last amounts to £37,095, to which is added a balance of £12,280, making available £49,375. The directors have allocated to reserve fund £10,000, and recommend a dividend of 11½ per cent., which with the interim dividend of 6½ per cent. makes 17½ per cent. for the year, leaving to be carried forward £16,800.

CHEMICAL AND METALLURGICAL CORPORATION.—The report for the year ended December 31 last, states that the proposals formulated by the board for the reorganisation and reduction of the capital, adopted by the shareholders, were sanctioned in court, and a subsequent issue at par of 1,500,000 ordinary shares of 2s. each was fully subscribed. The balance sheet as at December 31 shows expenditure during the year totalling £22,698; cash stood at £44,231; and tools, stores and ore stocks at £5,283; patents and rights, of which £774,548 was written off under the reconstruction scheme, appear at £279,509. The annual meeting will be held at River Plate House, London, on August 9, at 12.15 p.m.

W. AND H. M. GOULDING.—The report for the year ended June 30 last states that the net profits, including dividends from investments and subsidiary companies, and after making provision for discounts on outstanding accounts, amount to £33,665, which, with £2,297 brought forward from last account, makes £35,362 available for distribution. After providing for the usual debenture interest and fixed dividend at the rate of 5½ per cent. on the preference, the directors recommend a dividend of 5 per cent. on the ordinary shares for the year, of which 2s. 6d. per share is payable on July 31 and the second 2s. 6d. at December 31 next, less income tax. They further recommend that £5,000 be carried to depreciation account, leaving £3,237 to be carried forward.

CELLULOSE HOLDINGS AND INVESTMENT CO., LTD.—At the annual meeting held in London on July 28, the chairman, in moving the adoption of the report and accounts for the year ending June 30 last, and the declaration of a dividend of 7d. per share, free of income tax, said that that represented a slight increase over last year in the dividend on ordinary shares, paid out of approximately the same net profit, and allowed a sum of £8,244 to be carried forward. Referring to the relations with British Celanese, Ltd., the chairman stated that their legal expenses had been considerably higher owing to the dispute which they had considered it necessary to prosecute in defence of their interests. He believed that their action was also in the interests of the British Celanese shareholders, but as they decided against the proposals at the extraordinary general meeting held on March 9 last, the responsibility for the future must be on the shareholders' shoulders.

New Australian Research Council

THE first session of the Commonwealth Council for the Scientific and Industrial Research was opened in Melbourne recently. The Council include: Professor Rivett, department of chemistry, University of Melbourne; Professor Sir D. O. Masson, Emeritus Professor of Chemistry, University of Melbourne, and Professor H. A. Woodruff, department of veterinary pathology, Melbourne University. The field of work to be covered by the council will include liquid fuels, cold storage problems, forest products, animal diseases and pests, and plant diseases.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

DISC GRINDING MACHINES.—Tenders are invited by the Victoria Railways for the supply and delivery of two motor-driven disc grinding machines, including the necessary equipment. Tenders must reach Melbourne by 11 a.m. on September 29. A copy of the specifications may be seen by British firms offering British materials at the Department of Overseas Trade Offices, at Room 50. (Reference No. A.X. 3433.)

DRAG LINK ASH CONVEYOR.—The Electrical Engineer's Branch of the N.S.W. Government Railways and Tramways invite tenders for the supply and delivery of one drag link ash conveyor. Tenders will be received in Sydney up to noon on September 29. (Reference A.X. 3432.)

STEEL BARS, ETC.—The Director-General, India State Department, Branch No. 10, Belvedere Road, Lambeth, S.E.1, invites tenders for 148 tons mild steel rivets, black; 117 cwt. crucible cast high-speed tool steel; 1,360 tons mild steel bars (rounds, rods, angles, flats and squares), etc., due on August 20.

METALLURGICAL APPARATUS.—A manufacturer's agent and engineer established at Brussels is desirous of obtaining the representation on a commission basis of a British firm specialising in the construction and installation of special metallurgical apparatus. He would operate in Belgium and the Belgian Congo. Correspondence may be in English. (Reference No. 164.)

CHEMICALS, PHARMACEUTICAL PRODUCTS AND DRUGS.—An agent in Prague desires to secure the representation of British manufacturers on a commission basis. (Reference No. 165.)

CHEMICALS.—A commission agent of Barcelona desires the representation of British firms exporting chemicals and colours for dyers and printers. He is also interested in the sale of drugs and chemicals in general. (Reference No. 181.)

Tariff Changes

BASUTOLAND, BECHUANALAND AND SWITZERLAND.—High Commissioner's Notices Nos. 56, 59, 62 of 1926, dated June 7, 1926, impose dumping duties on imported cement from Great Britain, Belgium, Germany, Sweden, Jugo-Slavia, and the Province of Mozambique. These dumping duties are on the lines of those recently imposed on cement imported into the Union from these countries.

JAMAICA.—A Proclamation, dated May, 22, prohibits the import of dyes for use in colouring rum. This prohibition does not apply to dyes declared to the Collector-General's satisfaction for other uses.

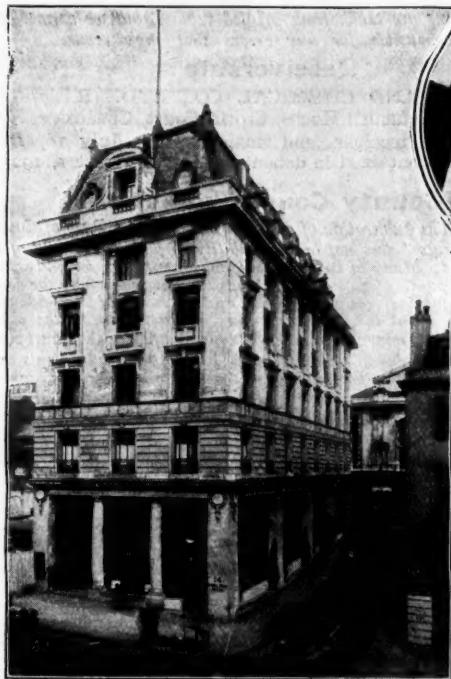
SUDAN.—The Customs (Amendment) Ordinance, 1926 (No. 8 of 1926), which came into force on May 31 contains schedules of import, export, and transit duties affecting pure alcohol and industrial spirit, medicinal preparations (containing distilled alcohol), charcoal, and denatured alcohol, etc.

GUATEMALA.—Reduced duties in respect of soap making materials, chemicals, essences and essential oils are announced.

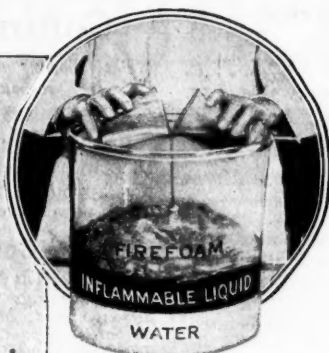
ITALY.—A Decree Law, dated June 5, adds olive oil for soap making to the list of goods which may be imported into Italy duty-free under the "Temporary Importation" regulation, besides steels of various kinds and aluminium. The *Gazzetta Ufficiale* for June 21 contains two Decree-Laws, coming into operation as from June 22, modifying (and in some cases withdrawing) the Customs duties on soya beans, chlorides of methyl, ethyl, methylene, etc.

SWEDEN.—A Swedish Royal Decree, dated June 4, reduces the excise duty on sugar manufactured in or imported into Sweden from 14 to 8 öre per kilogramme.

SWITZERLAND.—The *Recueil des Lois Fédérales* for July 14 contains a Decree of the Swiss Federal Council, dated July 8 and effective as from July 12, which increases from 1½ to 2½ francs per 100 kilos. the Customs duty on caustic soda, solid (ex Tariff No. 1,000), imported into Switzerland.



By courtesy of Messrs. The Dorland Agency, Ltd., London



Laboratory illustration showing how Fire-foam, generated by Foamite equipment, instantly smothers fire by blanketing the burning surface and so shutting out air. Inflammable liquids float upon water but Firefoam floats upon inflammable liquids. After a fire is out, Firefoam dries and may be brushed or washed away. There is no dripping or soaking through which is experienced with water or liquid chemicals.

None but the best was good enough

The completed wing of the new Dorland Agency building is equipped with Foamite appliances

The mistaken belief that all fire extinguishing methods are the same has lost hundreds of lives and millions in property.

That is why leaders in industry now call upon specialists to ensure that *the right fire protection is installed in the right place.*

Backed by a company manufacturing every type of first-aid fire appliance, Foamite Fire Protection Engineers are able to prescribe scientific safeguards for every kind of fire hazard.

Liquid—or Gas—or Foam

Water is effective upon ordinary fires. So are soda acid extinguishers, like the "Firespray," which discharge mostly water. But liquids are generally useless on oil fires—petrol fires—paint fires.

Gas, as formed by carbon tetrachloride from an extinguisher like the "Fire-Gun,"

has a distinct place in fighting certain types of fires. How often, though, are such devices used upon fires which they can *not* extinguish!

The foam method of smothering fire under a blanket of tough, clinging bubbles called Firefoam, is effective upon practically every type of fire. Not only does Firefoam instantly kill ordinary fires, but it is the only dependable method of extinguishing highly inflammable liquids. Yet even this method needs expert adaption to certain special risks.

Foamite representatives are always ready to *demonstrate*, upon request, the form of protection best suited to your particular hazard.

Send for a free copy of the booklet entitled "Extinguishing Oil and Other Fires," which describes the road to freedom from uncontrolled fire.

FOAMITE FIREFOAM, LTD.

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Representatives in all leading towns

Foamite Fire Protection

A Complete Engineering Service

Against Fire

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the registration of the following Trade Marks can be lodged up to September 4, 1926.

"PANKINE."

470,454. For photographic chemicals, plates and films (sensitised). Class 1. I. G. Farbenindustrie Aktiengesellschaft (a Joint Stock Company organised under the laws of Germany), Mainzer Landstrasse 28, Frankfurt-on-Main, Germany; manufacturers. June 8, 1926. (To be Associated. Sect. 24.)

"KINECHROM."

470,456. For particulars, see trade mark "Pankine."

"ACIDOLINE."

471,135. For paints, varnishes, enamels, dry colours, distempers, japans, lacquers and anti-corrosive oils. The International Paint and Composition Co., Ltd., 31 and 32, Grosvenor Place, London, S.W.1; manufacturers and general merchants. July 3, 1926.

"FLIPP."

469,620. For insecticides, disinfectants and deodorisers. Class 2. Standard Oil Co. (a corporation organised and existing under the laws of the State of New Jersey), Constable Hook, Bayoone, Hudson County, State of New Jersey, U.S.A. manufacturers, refiners and merchants. May 5, 1926. (To be Associated. Sect. 24.)

British Interests in Bergius Coal-Oil

PARTICULARS are now published as to the coal-oil process which is associated with the name of Dr. Frederick Bergius, of Heidelberg. Apart from Germany, the world rights are owned by a company registered in Holland in 1921 as International Bergin.

The International Bergin board is constituted as follows: Bataafsche Oil Co.—I.E.F. de Kok (chairman), W. C. Knoops. I.G. Farbenindustrie—Dr. H. Schmitz (Heidelberg), Dr. I. Abel (Ludwigshaven), and Dr. W. Gaus (Ludwigshaven). Delegated members are Dr. Bergius, Dr. Schmitz, Dr. Duiker, W. C. Knoops. Makot—Dr. F. Bergius (Heidelberg), Sir J. C. Calder (London), Dr. I. A. Duiker (Hague), Dr. K. Krauch (Ludwigshaven), E. Greutert (Basle). The board of the Makot Co. is Dr. Bergius, Heidelberg (chairman and delegated member), Dr. H. Schmitz, Dr. I. Abel, Sir James Calder and Howard Spence (Manchester). One member to be nominated.

For acquiring the British rights in the process several groups have formed themselves into a syndicate registered in England as the British Bergius Syndicate, of which Sir James Calder is chairman. The following now constitute the syndicate: International Sugar and Alcohol Co., Distillers Co., Brunner Mond and Co., Vickers, Gas Light and Coke Co., South Metropolitan Gas Co., H. W. Robinson (Birmingham), Sir James C. Calder, Pease and Partners, Dorman Long and Co., William Baird and Co., United Steel Companies, E. E. Barnes (Hasland Coking Co.), Powell Duffryn, Sadler and Co. (Middlesbrough), Staffordshire Chemical Co., Bolsover Colliery Co., Consett Iron Co., and H. Spence (Southport).

International Combustion Business

The grinding and pulverising offices of International Combustion, Ltd., 11, Southampton Row, London, report the sale of three 10 ft. by 36 in. cyl. Hardinge Conical Ball Mills equipped with special helical gear reduction, incorporating three 9 ft. Hardinge Superfine Classifiers for Dry Grinding, for England; one 4½ ft. by 13 in. cyl. Hardinge Conical Ball Mill for grinding copper ore, for South Africa; one 5 ft. by 22 in. cyl. Hardinge Conical Ball Mill for grinding zinc ashes dry, for France; one No. 00 Raymond Pulveriser, for England; one No. 00 Raymond Pulveriser for grinding clay, for Spain; one No. 4 Raymond Impax Pulveriser for grinding coal, for Italy; two Raymond Separating Plants, for Belgium; two 4 ft. Type 37 and Type 31 2-surface Hummer Electric Screens, for England.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Receivership

PRODUCE AND CHEMICAL CO., LTD. (R., 7/8/26.) D. Lewis, of Kennan's House, Crown Court, Cheapside, E.C., was appointed receiver and manager on July 16, 1926, under powers contained in debenture dated August 1, 1923.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

MYERS, Victor, 31, Bismarck Street, Beeston Hill, Leeds, soap manufacturer. (C.C., 7/8/26.) £41 5s. 4d. July 1.

RAYMOND AND CO., 5, New Quebec Street, W., toilet specialists. (C.C., 7/8/26.) £14 1s. 10d. June 30.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

STELLA GILL COKE AND BYE-PRODUCTS CO., LTD., London, E.C. (M., 7/8/26.) Registered July 21, £2,900 debentures, part of £300,000; general charge (except uncalled capital). *£236,900. June 25, 1925.

WILLIAMS (JOHN E.) AND CO., LTD., Manchester, paint manufacturers. (M., 7/8/26.) Registered July 23, charge to bank; charged on properties at Partington, with plant, etc. *£2,500. April 14, 1926.

Satisfaction

CHEMISTS' SUPPLY CO., LTD., Bournemouth. (M.S., 7/8/26.) Satisfaction registered July 26, £400 and £200, registered July 23, 1921.

London Gazette, &c.

Company Winding Up Voluntarily

WILKINSON AND NEWSHOLME, LTD. (C.W.U.V., 7/8/26.) J. H. Haley, incorporated accountant, 29, Tyrrel Street, Bradford, appointed liquidator, July 23.

New Companies Registered

AGRICULTURAL SPECIALISTS. Registered July 30, 1926. Seed crushers, manufacturers of linseed, cotton and other cakes, oil extractors, oil refiners, soap boilers, etc. Nominal capital, £600 in £1 shares. Solicitors: A. W. Taylor, 38, St. Nicholas Street, Bristol.

J. S. ASHWORTH, LTD., Dumers Lane, Radcliffe. Registered July 29, 1926. Chemical manufacturer. Nominal capital, £5,000 in £1 shares.

HARKNESS BEAUMONT AND CO., LTD., 253, Great Junction Street, Leith. Registered in Edinburgh July 29, 1926. Chemists, druggists, dysalsters, oil and colourmen, paint and colour grinders, etc. Nominal capital, £40,000 in 17,300 preference and 22,700 ordinary shares of £1 each.

PHENIX METAL CO., LTD. Registered July 28, 1926. Manufacturers of sulphuric, hydrochloric, nitric, phosphoric and other acids or derivatives thereof, sulphides, sulphites, chlorides, phosphates, colours, dyes, paints, ammonia and oils, etc. Nominal capital, £1,500 in £1 shares. Solicitors: D. O. Thomas and Williams, Swansea.

